

78

DATA VALIDATION AND STATISTICAL EVALUATION OF DECEMBER 2008 GROUNDWATER QUALITY DATA

CITY OF HELENA LANDFILL

Prepared For:

CITY OF HELENA
HELENA, MONTANA



Hydrometrics, Inc.
consulting scientists and engineers

FEBRUARY 2009

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February 24, 2009

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Dept. of Enviro. Quality
Waste & Underground
Tank Management Bureau

Mr. Martin Van Oort
Environmental Science Specialist
Solid Waste Regulatory Program
Montana Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

RE: Statistical Evaluation of December 2008 Groundwater Quality Data

Dear Martin,

On behalf of the City of Helena, Hydrometrics validated and statistically evaluated groundwater quality data for samples collected at the City's municipal landfill in December 2008. After receiving approval from John Rundquist and Ben Sautter of the City of Helena, I am forwarding a copy of the report "Data Validation and Statistical Evaluation of December 2008 Groundwater Quality Data City of Helena Landfill" for your review.

If you have any questions concerning this report, please don't hesitate to call.

Sincerely,

Jodi Bingham, P.E.
Environmental Engineer/Chemist

Enclosure

c: John Rundquist, City of Helena, without Enclosure
Ben Sautter, City of Helena, without Enclosure
Mike Wignot, Hydrometrics, without Enclosure

**DATA VALIDATION AND STATISTICAL
EVALUATION OF DECEMBER 2008
GROUNDWATER QUALITY DATA**

CITY OF HELENA LANDFILL

Prepared for:

Mr. John Rundquist
CITY OF HELENA
City/County Building
316 North Park Avenue
Helena, MT 59623

Prepared by:

Hydrometrics, Inc.
3020 Bozeman Avenue
Helena, MT 59601

February 2009

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**DATA VALIDATION AND STATISTICAL
EVALUATION OF DECEMBER 2008
GROUNDWATER QUALITY DATA
CITY OF HELENA LANDFILL**

1. REPORT OBJECTIVES

This report is prepared on behalf of the City of Helena Landfill to fulfill the groundwater data evaluation requirements provided in Administrative Rules, Montana (ARM) Title 17, Chapter 50. This report provides analytical results for groundwater samples collected at monitoring wells during the December 2008 monitoring event, summarizes, the data validation results and statistically evaluates the data. The samples were collected and analyzed in accordance with the Montana Department of Environmental Quality (MDEQ) approved sampling and analysis plan (Hydrometrics, 2008). This plan includes a reduction in sampling compared to the previously approved sampling program.

ARM 17.50.708(12) and ARM 17.50.708(13) stipulate the types of statistical data evaluations to be performed on groundwater quality monitoring data from regulated landfills. Federal guidance on conducting statistical evaluations of groundwater data is also available (EPA, 1989; EPA, 1992). These regulations and guidance documents allow the use of a wide range of statistical procedures including: parametric analysis of variance, non-parametric analysis of variance, tolerance or prediction interval testing, trend tests, or other statistical tests meeting the statistical testing objectives of the rules.

Statistical evaluations have been performed for this site semiannually since 1993 and the following conclusions have been reached based on the results of those evaluations:

- Chlorinated hydrocarbons occur downgradient of the landfill;

- Tetrachloroethene (PCE) is the chlorinated organic compound of greatest concern due to Maximum Contaminant Level (MCL) exceedances;
- Concentrations of PCE are decreasing over time in well EPA-1, the well that has historically shown the highest concentrations, and compliance wells HL-90-1, HL-99-1, HL-99-2, and HL-99-3; and
- Elevated nitrate plus nitrite as N (nitrate) concentrations exist both upgradient and downgradient of the landfill at similar levels.

These findings are further evaluated in this December 2008 statistical report through an assessment of current concentrations (Table 3-1), a comparison of summary statistics (Tables 3-2 and 3-3), an inter-well prediction analysis (Table 3-4), and an examination of temporal trends (Table 3-5 and Figures 3-1 and 3-2).

2. SITE DESCRIPTION

2.1 PHYSICAL FEATURES

A site location map is provided in Figure 2-1. The landfill is surrounded for several miles in all directions by residential, commercial and industrial zoned property. There are several businesses upgradient of the landfill, which have the potential to affect groundwater quality in the area.

A site plan is shown on Figure 2-2. The landfill is divided into three sections. The southern part of the landfill (Phase I and Phase II sections) is unlined and was in operation until the early 1980s. The northern part of the landfill (Phase III) is also unlined, and was in operation until November 1993. The Phase III landfill has been capped with an 18-inch clay cover to minimize surface water percolation through the landfill and subsequent migration of chemicals into groundwater.

2.2 WELL LOCATIONS

Fourteen monitoring wells located around the landfill are typically included in the groundwater monitoring program and are characterized as follows:

- Background wells: HL-06-1 (replacing 83-6), HL-94-1R, HL-94-2, MPC-5;
- Downgradient wells: HL-90-1, HL-90-2, HL-90-3, MPC-1, MPC-2,
EPA-1, HL-99-1, HL-99-2, HL-99-3; and
- Cross-gradient well: HL-94-3.

As discussed in Section 2.4 and in accordance with the approved sampling and analysis plan (Hydrometrics, 2008), only seven of these wells were sampled during the June sampling event. The locations of these wells are shown in Figure 2-2. Due to damage sustained by well 83-6, this well was abandoned in October 2006 and a new well, HL-06-1, was drilled to replace this important upgradient well. For historical comparisons in this report, results from HL-06-1 and 83-6 will be included.



NO SCALE

**CITY OF HELENA LANDFILL
DATA VALIDATION & STATISTICAL
EVALUATION OF DECEMBER 2008
GROUNDWATER QUALITY DATA**

VICINITY MAP

FIGURE

2-1



SITE CODE	DTWL	MPE	SWL
Dec-08			
HL-06-1	18.74	3993.62	3974.88
82-3	67.46	3973.51	3906.05
EPA-1	48.86	3981.08	3932.22
EPA-4	71.28	3973.83	3902.55
HL-90-1	58.64	3942.48	3883.84
HL-90-2	50.92	3950.96	3900.04
HL-90-3	62.56	3958.29	3895.73
HL-94-1R	60.04	3994.04	3934.00
HL-94-2	30.18	3966.19	3936.01
HL-94-3	37.65	3967.38	3929.73
HL-99-1	58.56	3943.15	3884.59
HL-99-2	59.61	3945.75	3886.14
HL-99-3	55.15	3948.05	3892.90
INF. GALLE	8.04	3918.89	3910.85
I-1	66.61	3899.59	3832.98
MPC-1	24.52	3946.08	3921.56
MPC-2	18.50	3936.09	3917.59
MPC-5	57.20	3990.14	3932.94



SCALE

0 (In Feet) 800

LEGEND

- HL-1 ■ PIEZOMETER
- 83-6 ● MONITORING WELL
- I-6 ▲ IRRIGATION WELL
- 80 □ DOMESTIC WELL
- INFILTRATION GALLERY (GROUNDWATER COLLECTION SYSTEM)
- AREA OF SHALLOW LOW PERMEABILITY BEDROCK
- POTENTIOMETRIC CONTOUR LINE
- INFERRED GROUNDWATER FLOW DIRECTION
- STORM WATER OUTFALL FOR LAST CHANCE GULCH

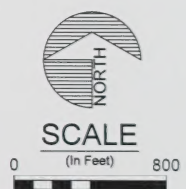
UDY AREA AND DECEMBER 2008
POTENTIOMETRIC SURFACE

FIGURE

2-2



SITE CODE	DTWL	MPE	SWL
Dec-08			
HL-06-1	18.74	3993.62	3974.88
82-3	67.46	3973.51	3906.05
EPA-1	48.86	3981.08	3932.22
EPA-4	71.28	3973.83	3902.55
HL-90-1	58.64	3942.48	3883.84
HL-90-2	50.92	3950.96	3900.04
HL-90-3	62.56	3958.29	3895.73
HL-94-1R	60.04	3994.04	3934.00
HL-94-2	30.18	3966.19	3936.01
HL-94-3	37.65	3967.38	3929.73
HL-99-1	58.56	3943.15	3884.59
HL-99-2	59.61	3945.75	3886.14
HL-99-3	55.15	3948.05	3892.90
INF. GALLE	8.04	3918.89	3910.85
I-1	66.61	3899.59	3832.98
MPC-1	24.52	3946.08	3921.56
MPC-2	18.50	3936.09	3917.59
MPC-5	57.20	3990.14	3932.94



- LEGEND**
- HL-1 ■ PIEZOMETER
 - 83-6 ● MONITORING WELL
 - I-6 ▲ IRRIGATION WELL
 - 80 □ DOMESTIC WELL
 - INFLTRATION GALLERY (GROUNDWATER COLLECTION SYSTEM)
 - AREA OF SHALLOW LOW PERMEABILITY BEDROCK
 - 3900 — POTENTIOMETRIC CONTOUR LINE
 - INFERRED GROUNDWATER FLOW DIRECTION
 - ⤵ STORM WATER OUTFALL FOR LAST CHANCE GULCH

CITY OF HELENA LANDFILL
DATA VALIDATION & STATISTICAL
EVALUATION OF DECEMBER 2008
GROUNDWATER QUALITY DATA

STUDY AREA AND DECEMBER 2008
POTENTIOMETRIC SURFACE

FIGURE
2-2

2.3 GROUNDWATER FLOW DIRECTION AND VELOCITY

Figure 2-2 shows water level elevations observed in December 2008 and groundwater potentiometric surface contours. Groundwater flow direction is also shown on this figure. The general groundwater flow direction in the vicinity of the landfill is to the north-northwest. The potentiometric surface in the area of well HL-94-3 suggests that groundwater flows to the west northwest (Figure 2-2); thus, well HL-94-3 is not considered to be upgradient or downgradient of the landfill. Well HL-94-3 has, therefore, been designated as a “cross-gradient” well.

Table 2-1 shows the groundwater velocities calculated for each of the monitoring wells sampled during the December 2008 sampling event. Slope was determined from the potentiometric contours shown in Figure 2-2. The hydraulic conductivities were obtained from the groundwater flow model inputs included in the report “Evaluation of Groundwater Extraction Remediation Alternative at the Helena Landfill” (Hydrometrics, 1999a). The porosity for each well was assumed to be 0.25. An average regional gradient of 0.0237 ft/ft was determined between monitoring well HL-06-1 and I-1. This yields an average regional velocity of 0.700 ft/day.

TABLE 2-1. GROUNDWATER VELOCITIES

Well	Hydraulic Conductivity (ft/day)	Slope (ft/ft)	Velocity (ft/day)
HL-90-1	20	0.0144	1.15
HL-94-1R	2.8	0.00312	0.0350
HL-99-1	10	0.0329	1.32
HL-99-2	20	0.0130	1.04
HL-99-3	20	0.0106	0.850
HL-06-1	0.03	0.0377	0.00452
MPC-5	2.8	0.0235	0.264

2.4 SUMMARY OF DECEMBER 2008 DATA VALIDATION REPORT

Seven monitoring wells around the landfill and two domestic wells were included in the December 2008 groundwater sampling event. The monitoring sites for this event for the City of Helena Landfill include the following:

- Monitoring wells HL-06-1, HL-90-1, HL-94-1R, HL-99-1, HL-99-2, HL-99-3, MPC-5; and
- Domestic wells 5 and 16.

Analytical parameters included metals, volatile organics, semi-volatile organics, halogenated organics, and major anions for the monitoring wells and volatile organics, semi-volatile organics, and halogenated organics for the domestic wells as specified in the approved sampling and analysis plan (Hydrometrics, 2008). In addition, to obtain a complete potentiometric map, static water levels (SWL) were obtained from nine additional monitoring wells, an irrigation well, and the infiltration gallery. The SWL sites for the latest sampling event include the following:

- Monitoring wells 82-3, HL-06-1, EPA-1, EPA-4, HL-90-1, HL-90-2, HL-90-3, HL-94-1R, HL-94-2, HL-94-3, HL-99-1, HL-99-2, HL-99-3, MPC-1, MPC-2, MPC-5;
- Irrigation well I-1; and
- The infiltration gallery.

The water samples collected for the City of Helena Landfill in December 2008 have been validated by the Hydrometrics' Data Validation Department in accordance with the project work plan, "Revised Sampling and Analysis Plan, City of Helena Landfill, Groundwater, Surface Water and Landfill Gas Monitoring Activities" (Hydrometrics, 2008). Lab and field quality control procedures were appropriate; quality control (QC) samples included a field duplicate (collected at HL-90-1), a trip blank, a rinseate blank, and standard internal laboratory QC samples. No parameters were reported as above the reporting limit in the trip blank. In the rinseate blank, nitrate + nitrite as N (nitrate), bromodichloromethane and chloroform were reported as above the reporting limit at concentrations of 0.06 mg/L, 0.0042

mg/L and 0.019 mg/L, respectively. The chloroform exceedance resulted in four associated results being flagged. Since this blank was obtained after sampling well HL-06-1 and this well did not have measurable concentrations of either chloroform or bromodichloromethane, the decontamination procedures are an unlikely source of the contamination. The DI water used was obtained from Culligan and is tested regularly. However, the water was stored in a plastic container with a #7 designation, known for leaching VOCs. In the future, the DI water used for this purpose will be stored in glass bottles and a DI blank will be taken. The duplicate sample pair showed very good agreement, compared with the control limits presented in EPA guidance. The entire data validation report is included as Appendix A of this report. Overall, the City of Helena Landfill data for December 2008 were deemed acceptable for the purposes of the project as outlined in the work plan.

3. STATISTICAL DATA EVALUATION AND COMPARISON

Four types of data evaluations were conducted using the December 2008 sample results for the seven monitoring wells sampled in the vicinity the landfill. (The two domestic wells are evaluated separately in Section 4.) These are:

1. Comparisons of applicable water quality criteria and upgradient (also called “background”) water quality with summary statistics of downgradient concentrations for December 2008 and all samples to date;
2. Inter-well prediction interval analysis;
3. Trend analysis; and
4. Temporal concentration plots.

The first three analyses include all those parameters for which results were reported above the detection limit in any of the seven monitoring wells for the December 2008 sampling event.

The fourth evaluation, temporal concentration plots, was performed for PCE and nitrate, the only constituents that currently exceed their regulatory limits in downgradient wells. Data from all wells which have historically shown PCE results above the detection limit of 0.001 mg/L and nitrate results above the MCL of 10 mg/L or with potentially increasing trends were evaluated.

3.1 DOWNGRADIENT WATER QUALITY COMPARISONS WITH CRITERIA AND UPGRADIENT WATER QUALITY

The following conclusions are derived from the December 2008 data and summary statistics in Tables 3-1, 3-2, and 3-3:

- (a) For the December 2008 sampling event (Tables 3-1 and 3-2), the following parameters were detected only in background (also called upgradient) wells: arsenic, copper, nickel, selenium, 1,1,1-trichloroethane, benzene, and total xylenes. Parameters detected in only downgradient wells include: zinc, 1,1-dichloroethane,

**TABLE 3-1. SUMMARY OF PARAMETER CONCENTRATIONS IN LANDFILL MONITORING WELLS
FOR THE DECEMBER 2008 MONITORING EVENT**

Parameter	Downgradient Wells				Upgradient Wells			MCL ⁽¹⁾
	HL-90-1	HL-99-1	HL-99-2	HL-99-3	HL-06-1	HL-94-1	MPC-5	
Field pH (s.u.)	6.72	7.14	7.31	7.47	6.66	7.26	6.78	NA
Field Specific Conductance (µmhos/cm)	1026	1167	926	924	1185	983	2987	NA
Sulfate	140	160	130	150	69	89	820	NA
Chloride	65	64	42	49	28	22	24	NA
Nitrate+Nitrite as N	8.25	8.77	7.49	8.22	1.2	3.74	17.3	10
Arsenic (Dissolved)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.01
Copper (Dissolved)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	1.3
Iron (Dissolved)	<0.03	<0.03	<0.03	0.26	<0.03	<0.03	1.69	0.3 ⁽²⁾
Nickel (Dissolved)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.10
Selenium (Dissolved)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.05
Zinc (Dissolved)	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	2
1,1,1-Trichloroethane	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	0.2
1,1-Dichloroethane	0.0019	<0.001	0.003	0.002	<0.001	<0.001	<0.001	NA
Benzene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0013	0.005
Chloroform	0.0011	0.0025	0.002	0.0021	<0.001	0.0052	<0.001	0.07
Cis-1,2-Dichloroethene	0.0011	0.0018	<0.001	<0.001	<0.001	<0.001	<0.001	0.07
Dichlorodifluoromethane	<0.001	<0.001	0.0029	0.0012	<0.001	<0.001	<0.001	1.0
Total Xylenes	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0012	10
Tetrachloroethene (PCE)	0.0059	0.0037	0.0064	0.0053	<0.001	<0.001	<0.001	0.005
Trichloroethene (TCE)	0.0012	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	0.005
Cyanide (Total)	<0.005	<0.005	<0.005	0.031	<0.005	<0.005	5.0	0.2
Chemical Oxygen Demand (COD)	2	<1	2	<1	<1	6	35	NA

Concentrations are in mg/L, except as indicated.

NM = not measured

(1) Primary Maximum Contaminant Levels promulgated under the Safe Drinking Water Act for protection of public drinking water supplies.

NA indicates no MCL has been promulgated.

(2) Secondary Maximum Contaminant Level based on aesthetic properties such as taste, odor, and staining.

Values in **bold** exceed the MCL.

**TABLE 3-2. COMPARISON OF DOWNGRADIENT CONCENTRATIONS WITH BACKGROUND CONCENTRATIONS
AND MCLs FOR THE DECEMBER 2008 SAMPLING EVENT**

Parameter	December 2008 Downgradient Well Concentrations (mg/L) (1)						Comparison Values (mg/L)				
	D.F. (3)	Min.	Mean (4)	Median	Max.	Max. Location	Background / Upgradient Wells (2)				MCL (5)
							D.F. (3)	Mean (4)	Median	Max.	
Field pH (s.u.)	4/4	6.72	7.16	7.23	<u>7.47</u>	HL-99-3	3/3	6.90	6.78	7.26	NA
Field Specific Conductance (µmhos/cm)	4/4	924	1011	976	1167	HL-99-1	3/3	1718	1185	2987	NA
Sulfate	4/4	130	145	145	160	HL-99-1	3/3	326	89	820	NA
Chloride	4/4	<u>42</u>	<u>55</u>	57	<u>65</u>	HL-90-1	3/3	25	24	28	NA
Nitrate+Nitrite as N	4/4	7.49	8.18	8.24	8.77	HL-99-1	3/3	7.41	3.74	17.3	10
Arsenic (Dissolved)	0/4	<0.005	<0.005	<0.005	<0.005	-	1/3	0.0053	<0.005	0.006	0.010
Copper (Dissolved)	0/4	<0.01	<0.01	<0.01	<0.01	-	1/3	0.013	<0.01	0.02	1.3
Iron (Dissolved)	1/4	<0.03	0.088	<0.03	0.26	HL-99-3	1/3	0.58	<0.03	1.69	0.3 (2)
Nickel (Dissolved)	0/4	<0.01	<0.01	<0.01	<0.01	-	1/3	0.013	<0.01	0.02	0.10
Selenium (Dissolved)	0/4	<0.005	<0.005	<0.005	<0.005	-	1/3	0.0057	<0.005	0.007	0.05
Zinc (Dissolved)	1/4	<0.01	<u>0.013</u>	<0.01	<u>0.02</u>	HL-99-1	0/3	<0.01	<0.01	<0.01	2
1,1,1-Trichloroethane	0/4	<0.001	<0.001	<0.001	<0.001	-	1/3	0.0023	<0.001	0.005	0.2
1,1-Dichloroethane	3/4	<0.001	<u>0.0020</u>	<u>0.0020</u>	<u>0.0030</u>	HL-99-2	0/3	<0.001	<0.001	<0.001	NA
Benzene	0/4	<0.001	<0.001	<0.001	<0.001	-	1/3	0.0011	<0.001	0.0013	0.005
Chloroform	4/4	0.0011	0.0019	0.0021	0.0025	HL-99-1	1/3	0.0024	<0.001	0.0052	0.07
Cis-1,2-Dichloroethene	2/4	<0.001	<u>0.0012</u>	<u>0.0011</u>	<u>0.0018</u>	HL-99-1	0/3	<0.001	<0.001	<0.001	0.07
Dichlorodifluoromethane	2/4	<0.001	<u>0.0015</u>	<u>0.0011</u>	<u>0.0029</u>	HL-99-2	0/3	<0.001	<0.001	<0.001	1.0
Total Xylenes	0/4	<0.001	<0.001	<0.001	<0.001	-	1/3	0.0011	<0.001	0.0012	10
Tetrachloroethene (PCE)	4/4	0.0037	0.0052	0.0054	0.0064	HL-99-2	0/3	<0.001	<0.001	<0.001	0.005
Trichloroethene (TCE)	2/4	<0.001	<u>0.0011</u>	<u>0.0011</u>	<u>0.0012</u>	HL-99-2	0/3	<0.001	<0.001	<0.001	0.005
Cyanide (Total)	1/4	<0.005	0.0115	<0.005	0.031	HL-99-3	1/3	1.67	<0.005	5.0	0.2
Chemical Oxygen Demand (COD)	2/4	<1	1.5	1.5	2.0	HL-99-1	2/3	14	6	35	NA

(1) Downgradient wells are: HL-90-1, HL-99-1, HL-99-2, HL-99-3.

(2) Background / Upgradient wells are: HL-06-1, HL-94-1, MPC-5.

(3) Detection frequency (D.F.), i.e. the number of detections over the total number of samples analyzed for that parameter.

(4) Means calculated using the detection limit for non-detected sample results.

(5) Primary Maximum Contaminant Levels promulgated under the Safe Drinking Water Act for protection of public drinking water supplies.

NA indicates no MCL has been promulgated.

(6) Secondary Maximum Contaminant Level based on aesthetic properties such as taste, odor, and staining.

Values in **bold** exceed the MCL. Underlined values exceed the maximum background/upgradient concentration.

**TABLE 3-3. COMPARISON OF DOWNGRADIENT CONCENTRATIONS WITH BACKGROUND CONCENTRATIONS
AND MCLs FOR ALL SAMPLING EVENTS TO DATE**

Parameter	Period of Record Downgradient Well Concentrations (mg/L) ⁽¹⁾						Comparison Values (mg/L)				
	D.F. ⁽³⁾	Min.	Mean ⁽⁴⁾	Median	Max.	Max. Location	Background / Upgradient Wells ⁽²⁾				MCL ⁽⁵⁾
							D.F. ⁽³⁾	Mean ⁽⁴⁾	Median	Max.	
Field pH (s.u.)	143/143	6.58	7.4	7.34	8.59	HL-99-3	85/85	7.34	7.3	8.58	NA
Field Specific Conductance (µmhos/cm)	143/143	220	947	945	1182	HL-99-1	85/85	1580	924	4885	NA
Sulfate	82/82	15	133	130	190	HL-99-1	81/81	343	120	1980	NA
Chloride	82/82	29	41.2	40	71	HL-99-1	80/81	31.7	25	195	NA
Nitrate+Nitrite as N	78/78	4.75	7.89	7.84	9.6	HL-99-1	76/76	13.4	7.33	73	10
Arsenic (Dissolved)	1/82	<0.005	<0.005	<0.005	0.01	HL-99-3	17/83	0.006	<0.005	0.037	0.010
Copper (Dissolved)	0/78	<0.01	<0.01	<0.01	<0.01	-	2/78	0.01	<0.01	0.02	1.3
Iron (Dissolved)	27/82	<0.03	0.098	<0.03	1.0	HL-99-1	39/81	0.392	<0.03	3.14	0.3 ⁽²⁾
Nickel (Dissolved)	0/77	<0.01	<0.01	<0.01	<0.01	-	18/78	0.011	<0.01	0.05	0.10
Selenium (Dissolved)	0/82	<0.005	<0.005	<0.005	<0.005	-	20/83	0.005	<0.005	0.01	0.05
Zinc (Dissolved)	8/78	<0.01	0.013	<0.01	0.09	HL-90-1	12/78	0.012	<0.01	0.1	2
1,1,1-Trichloroethane	45/152	<0.001	0.001	<0.001	0.007	HL-90-1	9/87	0.001	<0.001	0.006	0.2
1,1-Dichloroethane	121/152	<0.001	<u>0.002</u>	<u>0.002</u>	<u>0.005</u>	HL-99-3	0/87	<0.001	<0.001	<0.001	NA
Benzene	0/152	<0.001	<0.001	<0.001	0.002	-	22/87	0.006	<0.001	0.077	0.005
Chloroform	146/152	0.001	0.002	0.002	0.006	HL-90-1	68/87	0.006	0.003	0.037	0.07
Cis-1,2-Dichloroethene	43/147	<0.001	<u>0.001</u>	<0.001	<u>0.003</u>	HL-99-1	0/82	<0.001	<0.001	<0.001	0.07
Dichlorodifluoromethane	109/152	<0.001	<u>0.002</u>	<0.001	<u>0.015</u>	HL-90-1	0/87	<0.001	<0.001	<0.001	1.0
Total Xylenes	1/53	<0.001	0.001	<0.001	0.001	HL-90-1	7/29	0.007	<0.001	0.053	10
Tetrachloroethene (PCE)	150/152	<0.001	0.007	0.006	0.024	HL-99-3	0/87	<0.001	<0.001	<0.001	0.005
Trichloroethene (TCE)	89/152	<0.001	<u>0.001</u>	<0.001	<u>0.003</u>	HL-99-3	0/87	<0.001	<0.001	<0.001	0.005
Cyanide (Total)	34/85	<0.005	0.010	<0.005	0.038	HL-99-3	24/86	1.28	<0.005	10.9	0.2
Chemical Oxygen Demand (COD)	49/81	0.3	3.15	2	25	HL-99-3	63/82	14.4	7	75	NA

(1) Downgradient wells are: HL-90-1, HL-99-1, HL-99-2, HL-99-3.

(2) Background / Upgradient wells are: 83-6, HL-06-1, MPC-5, HL-94-1, HL-94-2.

(3) Detection frequency (D.F.), i.e. the number of detections over the total number of samples analyzed for that parameter.

(4) Means calculated using the detection limit for non-detected sample results.

(5) Primary Maximum Contaminant Levels promulgated under the Safe Drinking Water Act for protection of public drinking water supplies.

NA indicates no MCL has been promulgated.

(6) Secondary Maximum Contaminant Level based on aesthetic properties such as taste, odor, and staining.

Values in **bold** exceed the MCL. Underlined values exceed the maximum background/upgradient concentration.

- (b) cis-1,2-dichloroethene, dichlorodifluoromethane, tetrachloroethene (PCE), and trichloroethene (TCE).
- (c) Parameters historically detected only in downgradient wells (Table 3-3) include: 1,1-dichloroethane, cis-1,2-dichloroethene, dichlorodifluoromethane, PCE, and TCE. Parameters historically detected in only upgradient wells include copper, nickel, selenium, and benzene.
- (d) Nitrate, iron, cyanide, and PCE were reported at concentrations exceeding MCL criteria in the December 2008 sampling event (Tables 3-1 and 3-2). The MCLs for nitrate and cyanide were both exceeded in a single upgradient well (MPC-5); the MCL for PCE was exceeded in two downgradient wells (HL-99-2 and HL-99-3); the secondary MCL (based on aesthetic properties rather than human health standards) for iron was exceeded in a single upgradient well (MPC-5).
- (e) Historically in these wells, nitrate, arsenic, iron, benzene, PCE, and cyanide have been reported at concentrations exceeding MCL criteria (Table 3-3). The MCL for PCE has been exceeded in only downgradient wells; arsenic and iron have exceeded their MCLs in both upgradient and downgradient wells and the MCLs for nitrate, benzene, and cyanide have been exceeded in only upgradient wells. The December 2008 data is generally consistent with these trends.
- (f) PCE was detected in all four downgradient wells in the December 2008 sampling event, two of which (HL-99-2 and HL-99-3) exceeded the MCL 0.005 mg/L (Table 3-1). The concentrations of PCE in well HL-99-2 have shown seasonal fluctuations but no increasing or decreasing trend since its installation. Well HL-99-3 has also shown seasonal fluctuations with a decreasing trend in the last six years. Parameter trends are further discussed in Section 3.2.
- (g) Nitrate was detected in all of the December 2008 samples. The MCL of 10.0 mg/L was exceeded in one sample collected in upgradient well (MPC-5). Monitoring well MPC-5 showed an increasing trend from 1998 through 2005 reaching a maximum of 73.0 mg/L. Since then, there has been a decrease in the nitrate concentration in this well and is currently at a level of 17.3 mg/L. Discussions with MPC representatives revealed that an attempt to remediate cyanide (from a historic coal gasification plant

that was operated just east of the landfill) through oxidation may have inadvertently increased nitrate concentration in area groundwater. This pilot program was shut down when these adverse affects became apparent.

(h) Cyanide was detected in one downgradient well (HL-99-3) and one upgradient well (MPC-5) during the December 2008 sampling event. The downgradient detection was well below the MCL of 0.2 mg/L, but upgradient well MPC-5 (5.0 mg/L) exceeded the MCL. Previous sampling events have shown that cyanide is present at concentrations ranging from approximately 0.77 to 11 mg/L (based on data collected from June 1995 through December 2008) in upgradient well MPC-5. Historically, downgradient detections of cyanide have been well below the MCL indicating that elevated cyanide levels are not attributable to the Helena Landfill (Table 3-3). As noted previously, a coal gasification plant was historically operated east of the landfill site and could be a source of residual cyanide in groundwater upgradient of the landfill.

(i) Metals and arsenic concentrations in groundwater samples have historically been low (typically below laboratory detection limits). Arsenic, copper, nickel and selenium were detected only in upgradient well MPC-5; iron was detected in downgradient well HL-99-3 and upgradient well MPC-5; and zinc was detected only in downgradient well HL-99-1 during December 2008 monitoring (Table 3-1). The detected arsenic and metal concentrations were all at or near their detection limits except for iron in downgradient well HL-99-3 and upgradient well MPC-5 (0.26 and 1.69 mg/L, respectively) compared to a detection limit of 0.03 mg/L. Iron exceeded the secondary MCL of 0.3 mg/L (based on aesthetic properties such as taste, odor and staining rather than human health standards) in well MPC-5. Iron has historically fluctuated at MPC-5 with concentrations ranging from approximately 0.2 mg/L to 4 mg/L (based on data collected from December 1995 through December 2008).

(j) During the December 2008 sampling event, a number of chlorinated organic compounds (i.e., dichlorodifluoromethane, PCE, and TCE) were detected in samples from downgradient wells, but not in samples from background (upgradient) wells (see (a) above). PCE was the only chlorinated organic compound to exceed its MCL in

downgradient wells (HL-90-1, HL-99-2, and HL-99-3). 1,1,1-Trichloroethane, benzene, and total xylenes were detected only in background wells at levels well below their respective MCLs. Chloroform was the only VOC detected in samples from both downgradient and background wells. All detections of chloroform were well below the MCL of 0.07 mg/L.

3.2 INTER-WELL PREDICTION INTERVAL ANALYSIS

An inter-well prediction interval analysis was used to test for statistically significant differences between background and compliance well concentrations for selected parameters (those above the detection limit in any of the seven monitoring wells for the December 2008 sampling event). Combining all historical data for the background wells, the Shapiro-Francia Test of Normality was performed for each parameter to determine the distribution of the background data. Inter-well parametric prediction intervals were used when the background data were normally or ln-normally distributed. In cases where the background data were not normally or ln-normally distributed, a non-parametric prediction limit was used. Results of the prediction interval test are summarized in Table 3-4. Documentation for each of these statistical tests used is included in Appendix B of this report.

As shown on Table 3-4, parameters 1,1-dichloroethane, cis-1,2-dichloroethane, dichlorodifluoromethane, tetrachloroethene, and trichloroethene have statistically greater concentrations in downgradient wells than upgradient wells.

3.3 TREND ANALYSIS

In addition to evaluating the chemical concentrations in upgradient and downgradient wells around the landfill for the December 2008 sampling event, it is also important to evaluate concentration trends of key constituents over time. For each parameter exceeding the prediction limits discussed in the previous section, statistical testing for trends was performed for each downgradient well using the Mann-Kendall test. The results of these analyses are summarized in Table 3-5. Documentation for these statistical tests is included in Appendix B of this report. Cis-1,2-Dichloroethane is showing increasing trends in two downgradient

TABLE 3-4. RESULTS OF INTER-WELL PREDICTION INTERVAL TESTS

Parameter	Background Wells		Downgradient Wells			
	Distribution ⁽¹⁾	Prediction Limit ⁽²⁾	HL-90-1	HL-99-1	HL-99-2	HL-99-3
Field pH (s.u.)	Norm (95%)	6.15-8.68	6.72	7.14	7.31	7.47
Field Specific Conductance (µmhos/cm)	Non-Norm	4395	1026	1167	926	924
Sulfate	Non-Norm	1819	140	160	130	150
Chloride	Non-Norm	193	65	64	42	49
Nitrate+Nitrite as N	Non-Norm	71	8.25	8.77	7.49	8.22
Arsenic (Dissolved)	Non-Norm	0.034	<0.005	<0.005	<0.005	<0.005
Copper (Dissolved)	Non-Norm	0.019	<0.01	<0.01	<0.01	<0.01
Iron (Dissolved)	Non-Norm	2.93	<0.03	<0.03	<0.03	0.26
Nickel (Dissolved)	Non-Norm	0.029	<0.01	<0.01	<0.01	<0.01
Selenium (Dissolved)	Non-Norm	0.010	<0.005	<0.005	<0.005	<0.005
Zinc (Dissolved)	Non-Norm	0.020	<0.01	0.02	<0.01	<0.01
1,1,1-Trichloroethane	Non-Norm	0.0049	<0.001	<0.001	<0.001	<0.001
1,1-Dichloroethane	ND	0.001	0.0019	<0.001	0.003	0.002
Benzene	Non-Norm	0.065	<0.001	<0.001	<0.001	<0.001
Chloroform	Non-Norm	0.036	0.0011	0.0025	0.002	0.0021
Cis-1,2-Dichloroethene	ND	0.001	0.0011	0.0018	<0.001	<0.001
Dichlorodifluoromethane	ND	0.001	<0.001	<0.001	0.0029	0.0012
Total Xylenes	Non-Norm	0.050	<0.001	<0.001	<0.001	<0.001
Tetrachloroethene (PCE)	ND	0.001	0.0054	0.0037	0.0064	0.0053
Trichloroethene (TCE)	ND	0.001	0.0012	<0.001	0.0012	<0.001
Cyanide (Total)	Non-Norm	10.5	<0.005	<0.005	<0.005	0.031
Chemical Oxygen Demand (COD)	Non-Norm	65	2	<1	2	<1

(1) Normality was calculated using the Shapiro-Francia test.

Norm (X%) = data normally distributed at X% level of significance.

ln-Norm (X%) = data ln-normally distributed at X% level of significance.

Non-Norm = data not normally or ln-normally distributed at 95% or 99% level of significance.

ND = all background data below detection limits. Value shown is the detection limit.

(2) Prediction limits calculated as follows:

Normal or ln-normal distribution: parametric prediction interval (99% one-sided, two-sided for pH)

Non-normal distribution: non-parametric prediction interval (99% one-sided, two-sided for pH)

ND: any detectable concentrations in compliance wells are considered significant.

Bold values indicate statistically significant results.

NA - not analyzed

wells; according to National Primary Drinking Water Regulations, cis-1,2-dichloroethane is formed as a breakdown product from the reductive dehalogenation of the common industrial solvents TCE and PCE. Dichlorodifluoromethane, PCE, and TCE are showing decreasing trends in downgradient wells. 1,1-Dichloroethane is showing increasing and decreasing trends in downgradient wells; this compound is a breakdown product of 1,1,1-trichloroethane, historically found primarily in wells upgradient of the Helena landfill.

TABLE 3-5. RESULTS OF MANN-KENDALL TREND ANALYSES

Parameter	HL-90-1	HL-99-1	HL-99-2	HL-99-3
1,1-Dichloroethane	No Trend	Decreasing	Increasing	No Trend
Cis-1,2-Dichloroethane	Increasing	Increasing	No Trend	No Trend
Dichlorodifluoromethane	Decreasing	Decreasing	No Trend	Decreasing
Tetrachloroethene (PCE)	Decreasing	Decreasing	No Trend	Decreasing
Trichloroethene (TCE)	Decreasing	Decreasing	No Trend	No Trend

3.4 TEMPORAL CONCENTRATION PLOTS

This report focuses on concentration trends for PCE and nitrate because they are the only constituents currently exceeding their MCLs in downgradient monitoring wells. PCE was also the focus of the Corrective Measures Assessment for the landfill (Hydrometrics, 1995).

In an attempt to reduce concentrations of PCE in compliance well HL-90-1, the City installed a groundwater extraction system in the spring of 2000. This treatment system involves pumping wells HL-99-1, HL-99-2 and HL-99-3 to intercept PCE leaving the landfill, and treating the water to remove VOCs prior to land application on Bill Roberts Golf Course. These wells have been included in groundwater monitoring events along with compliance well HL-90-1 to evaluate the progress of this new groundwater extraction system.

Trends in PCE concentrations over time from 1998 through December 2008 for selected monitoring wells are shown on Figure 3-1. PCE concentrations exceeded the MCL value of 0.005 mg/L in monitoring wells HL-90-1, HL-99-2 and HL-99-3 for December 2008. The PCE concentrations in pumping wells HL-99-1, HL-99-2 and HL-99-3 have shown seasonal

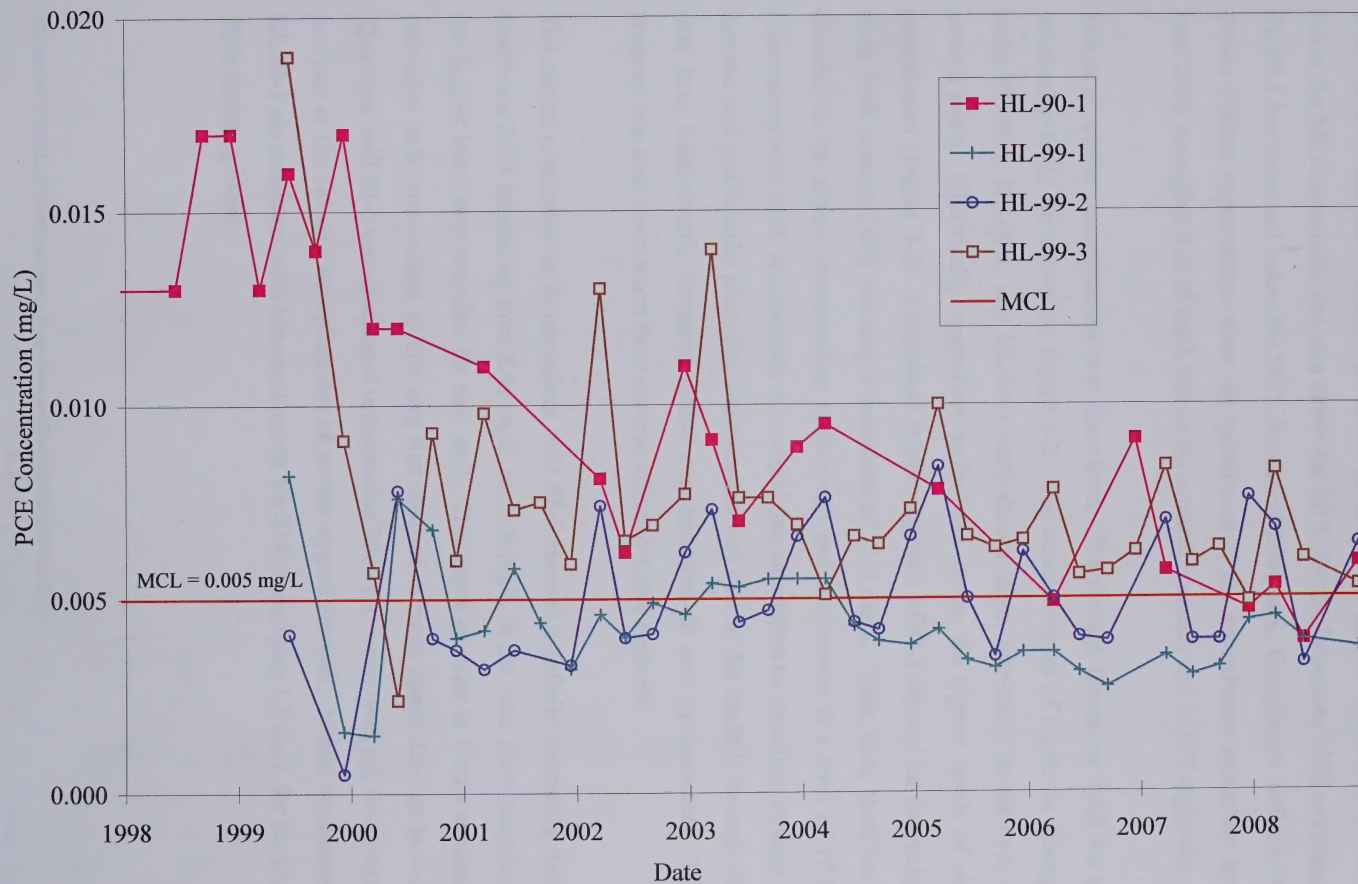


Figure 3-1. Temporal Trends in Tetrachloroethene Concentrations at Selected Downgradient Wells

fluctuations and decreasing trends in HL-99-1 and HL-99-3 since their installation in 1999. Well HL-99-3 fluctuates mostly just above the MCL. Well HL-99-2 fluctuates above and below the MCL seasonally and was above the MCL for the December 2008 sampling. Well HL-99-1 has remained below the MCL for almost five years. Compliance well HL-90-1 has shown definite improvement since the installation of the groundwater extraction system in June 2000, averaging 0.0146 mg/L before the extraction system and 0.0077 mg/L after.

Trends in nitrate concentrations over time from 1998 through December 2008 for selected monitoring wells are shown on Figure 3-2. The concentrations of nitrate in downgradient wells HL-99-1, HL-99-2, and HL-99-3 have shown slight increasing trends over the last several years. Historically, upgradient wells have shown the highest levels of nitrate in groundwater (Figure 3-2). Upgradient monitoring well MPC-5 showed an increasing trend from 1998 through 2005 reaching a maximum of 73.0 mg/L. Since then, there has been a decrease in the nitrate concentration in this well and is currently at a level of 17.3 mg/L. Discussions with MPC representatives revealed that an attempt to remediate cyanide (from a historic coal gasification plant that was operated just east of the landfill) through oxidation may have inadvertently increased nitrate concentrations in area groundwater. This pilot program was shut down when these adverse affects became apparent.

The nitrate concentration in upgradient well 83-6 showed a definite increasing trend since December 2003 increasing from 8.44 mg/L to 71.6 mg/L in the June 2006 sampling event, the highest level ever recorded for this well. This rapid increase in nitrate concentrations coincided with construction in this area that resulted in some minor damage to well 83-6. Therefore, well 83-6 was abandoned in November 2006 and a new well, HL-06-1, was drilled just east of the old well to replace this important upgradient well. Nitrate concentrations in HL-06-1 are consistent with historical results for 83-6, measuring 1.2 mg/L for the December 2008 sampling event.

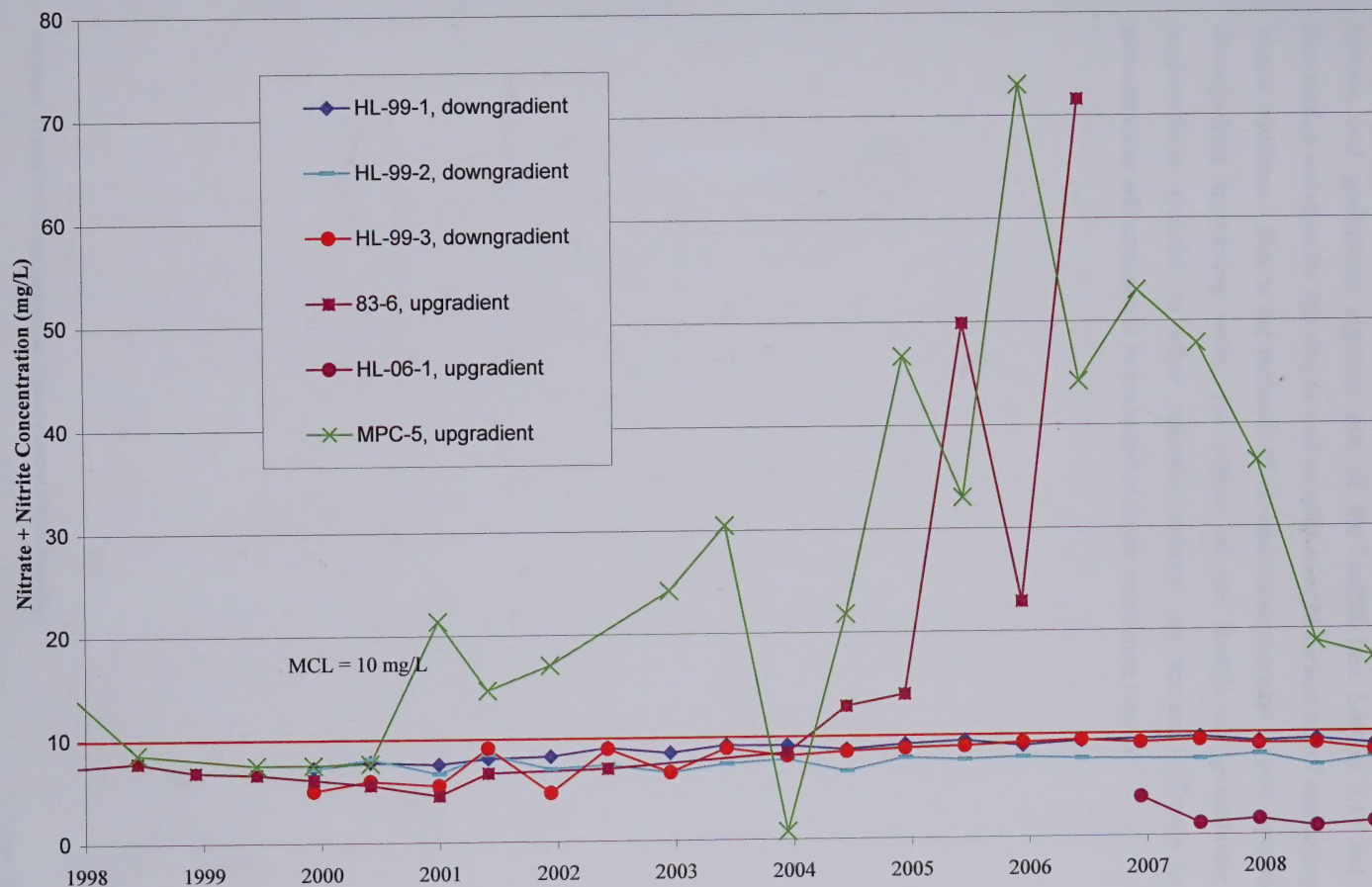


Figure 3-2. Temporal Trends in Nitrate Concentrations at Selected Wells

In addition to landfill leachate, other potential sources of nitrate in groundwater include historic coal gasification activities east of the landfill (see Section 3.1) and cyanide remediation activities for this site, as well as infiltration of surface runoff containing soluble nitrate fertilizers. Due to the presence of elevated concentrations in both upgradient and downgradient monitoring wells, the effects of the landfill on groundwater nitrate concentrations (relative to other potential sources) are unclear. Trends in nitrate concentrations will continue to be evaluated in future monitoring reports.

4. DOMESTIC WELL DATA EVALUATION

Domestic wells 5 and 16 were also sampled during the December 2008 sampling event. For both wells, the only concentrations of VOCs reported above the detection limit were for chloroform (0.002 mg/L and 0.0013, respectively) and tetrachloroethene (0.0029 mg/L and 0.0010 mg/L, respectively). All detections were below their respective MCLs. The concentrations for all parameters for both wells were similar to concentrations measured in these wells during the June 2008 sampling event.

5. SUMMARY AND CONCLUSIONS

This statistical evaluation of the December 2008 sample results indicated that 1,1-dichloroethene, cis-1,2-dichloroethene, dichlorodifluoromethane, PCE and TCE were detected in downgradient wells at levels statistically greater than upgradient wells. PCE was the only groundwater constituent that exceeded the primary MCL (federal drinking water standard) in one or more downgradient wells. The MCLs for nitrate and cyanide and the secondary MCL for iron were exceeded in upgradient well MPC-5.

PCE exceeded the federal MCL in downgradient wells HL-90-1, HL-99-2, and HL-99-3. To address the elevated PCE concentrations in compliance well HL-90-1, a groundwater extraction system was installed and began operation in June 2000. Groundwater is being pumped from three wells (HL-99-1, HL-99-2 and HL-99-3) located to intercept PCE leaving the landfill, and treated to remove VOCs prior to land application. These wells are included in the semiannual groundwater monitoring events to evaluate the progress of the new system. Concentrations of PCE in compliance well HL-90-1 and extraction wells HL-99-1 and HL-99-3 show a statistically decreasing trend.

6. REFERENCES

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APPENDIX A

DATA VALIDATION REPORT

**DATA VALIDATION REPORT
GROUNDWATER QUALITY DATA
SEMI-ANNUAL SAMPLING
DECEMBER 2008
CITY OF HELENA LANDFILL**

Prepared For:
CITY OF HELENA
HELENA, MONTANA



Hydrometrics, Inc.
consulting scientists and engineers

JANUARY 2009

**DATA VALIDATION REPORT
CITY OF HELENA LANDFILL**

**Groundwater Samples Collected in
December 2008
(Semi-Annual Sampling)**

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January 2009

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GLOSSARY OF TERMS

CCB.....	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CLP	Contract Laboratory Program
CRDL.....	Contract Required Detection Limit
FAA	Flame Atomic Absorption
GFAA.....	Graphite Furnace Atomic Absorption
HGAA.....	Hydride Generation Atomic Absorption
ICB.....	Initial Calibration Blank
ICP	Inductively Coupled Plasma
ICV.....	Initial Calibration Verification
IDL.....	Instrument Detection Limit
LCS	Laboratory Control Sample
MSA.....	Method of Standard Additions
PB.....	Preparation Blank
PRDL	Project Required Detection Limit
QAPP	Quality Assurance Project Plan
QC.....	Quality Control
RPD.....	Relative Percent Difference
RSD.....	Relative Standard Deviation
SOW.....	Statement of Work
TDS.....	Total Dissolved Solids

SUMMARY

Groundwater samples collected for the City of Helena Landfill in December 2008 have been validated in accordance with the project work plan, "Revised Sampling and Analysis Plan; City of Helena Landfill; Groundwater, Surface Water, and Landfill Gas Monitoring Activities" (Hydrometrics, March 2008).

The data quality objectives for accuracy and precision were met, as 99 percent of the field quality control sample results were within control limits and 99 percent of the laboratory quality control samples were within limits. Completeness as evaluated by the number of valid measurements (measurements not rejected) per number of actual measurements, was 100 percent. Further discussion of data quality objectives is in Section 12 of the data validation report.

All tables are in Appendix 1: data validation codes and definitions are listed in Table 1; a brief summary of flagged data is in Table 2; and a historical comparison is in Table 3. A database printout of this sampling event is located in Appendix 2. The Hydrometrics field notes are in Appendix 3. Energy Laboratories Analytical Reports are located in Appendix 4.

DATA VALIDATION REPORT

1. INTRODUCTION

This validation applies to organic analytes for 26 water samples collected for the City of Helena Landfill quarterly monitoring project during the December 2008 sampling event. The sampling took place on December 10th, 11th, and 18th of 2008. The total number of samples included: nine groundwater samples, fourteen field observations, one field duplicate, one rinsate blank, and one trip blank.

Samples were submitted for volatile organic analyses, and select samples were submitted for inorganic analyses (metals and commons) as follows:

SITE CODE	DATE	SAMPLE NUMBER	WATER LEVEL MEASUREMENT	FIELD PARAMETERS ¹	METALS AND COMMONS ²	VOLATILE ORGANIC COMPOUNDS ³
Res #5	12/10/08	HL-0812-100	X	X	X	X
HL-94-1	12/10/08	HL-0812-101	X	X	X	X
HL-90-1	12/11/08	HL-0812-102	X	X	X	X
HL-90-1 DUP	12/11/08	HL-0812-103	X	X	X	X
MPC-5	12/11/08	HL-0812-104	X	X	X	X
HL-06-1	12/11/08	HL-0812-105	X	X	X	X
HL-99-3	12/11/08	HL-0812-106	X	X	X	X
HL-99-2	12/11/08	HL-0812-107	X	X	X	X
HL-99-1	12/11/08	HL-0812-108	X	X	X	X
RINS BLANK	12/11/08	HL-0812-109			X	X
Res #16	12/18/08	HL-0812-110	X	X	X	X
TRIP BLANK	12/11/08	HL-0812-111				X
82-3	12/10/08	HL-0812-112	X			
83-7	12/10/08	HL-0812-113	X			
EPA-1	12/10/08	HL-0812-114	X			
EPA-2	12/10/08	HL-0812-115	X			
EPA-4	12/10/08	HL-0812-116	X			
HL-90-2	12/10/08	HL-0812-117	X			
HL-94-2	12/10/08	HL-0812-118	X			
I-1	12/10/08	HL-0812-119	X			
I-4	12/10/08	HL-0812-120	X			
INF. GALLERY	12/10/08	HL-0812-121	X			
MPC-1	12/10/08	HL-0812-122	X			
MPC-2	12/10/08	HL-0812-123	X			
HL-94-3	12/10/08	HL-0812-124	X			
HL-90-3	12/10/08	HL-0812-125	X			

1. Field parameters include: pH, SC, and water temperature.

2. Metals / commons include those compounds listed in the first half of ARM 17.50.708 Table 1. See Appendix C of the work plan.

3. Volatile organic compounds include those listed in the second half of ARM 17.50.708 Table 1. See Appendix C of the work plan.

- Validation procedures used are generally consistent with:
(Check all that apply)
☒ EPA CLP National Functional Guidelines for Inorganics Data Review
☒ EPA CLP National Functional Guidelines for Organic Data Review
☒ Guidance on Environmental Data Verification and Data Validation
☒ Work Plan (Sampling and Analysis Plan, City of Helena Landfill
 Groundwater Monitoring Activities, Hydrometrics, March 2008)
- Overall level of validation:
☐ Contract Laboratory Program (CLP)
☒ Standard
☐ Visual

The review of this data includes checking all field and laboratory quality control samples; flagging for exceedances in field quality control; and calculating precision, accuracy, and completeness for both laboratory and field quality control samples.

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW), EPA, 1993 and/or the project contract.
☒ Yes
☐ No
- All documentation of field procedures was provided as required.
☐ Yes
☒ No (Notes)

NOTES: During purging of a sampling well, field parameters should be measured several times and recorded on the stabilization portion of the field sampling forms, this was not completed for the December 2008 sampling event. Meeting stabilization requirements was discussed with Hydrometrics staff and will be completed in the future.

- Consistency with project requirements
 Sampling was completed in order as stated in the SAP.
☒ Yes – see following notes
☐ No

NOTES: It should be noted that the wells were not sampled in the order listed in the SAP. As discussed with Hydrometrics staff, the order of sampling is important for all wells that do not use dedicated or disposable equipment. In the future, Hydrometrics will be sure to note any differences from the order in SAP to the actual order completed by noting the change in the field book.

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks:**
 Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

DI, trip, rinsate, or any other field blanks have been carried out at the proper frequency.

☒ Yes

☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.

☐ Yes

☒ No (Notes)

NOTES: Field blank HL-0812-109 (Rinsate Blank) had results that exceeded the contract required detection limit for nitrate + nitrite as n, bromodichloromethane, and chloroform. The chloroform exceedance resulted in four associated results being flagged.

- **Field duplicates**

Field duplicates have been collected at the proper frequency.

☒ Yes

☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☒ Yes

☐ No

- **Field standards**

Field standards were sent at the proper frequency

☐ Yes

☐ No

☒ NA - Not required by the work plan.

4. LABORATORY PROCEDURES

- Laboratory procedures followed

☐ CLP-SOW

☒ SW-846

☒ Methods for Chemical Analysis of Water and Wastes

☐ XRF Standard Operating Procedures

☐ Other

- Samples were received by the laboratory at the proper temperature

☒ Yes

☐ No

- Holding times met
☒ Yes
☐ No
- Consistency with project requirements
 Analyses were carried out as requested.
☒ Yes
☐ No

 Project specified methods were used.
☒ Yes – see following notes
☐ No

NOTES: It should be noted that Energy Laboratories used a different method than stated in the work plan on the following parameters: pH, SC, cyanide, and dissolved metals. The methods used are considered comparable to stated methods in work plan.

5. DETECTION LIMITS

- Reporting detection limits met project required detection limits (PRDL).
☒ Yes – see following notes
☐ No

NOTES: It should be noted that Energy Laboratories used a reporting limit of 0.005 mg/L instead of 0.05 mg/L for dissolved antimony; a reporting limit of 0.005 mg/L was also used instead of 0.1 mg/L as requested for dissolved thallium. The reporting limits used were lower than the requested limits, and did not seem to impact the results.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- Preparation/Method blanks
 Preparation/Method blanks were prepared and analyzed at the required frequency.
☒ Yes
☐ No

 All analytes in the preparation blank were less than the CRDL (or PRDL if a project detection limit has been specified).
☒ Yes – see following notes
☐ No

NOTES: Low concentrations of some parameters were noted in two of the laboratory blanks; however, all results were within laboratory-specified control limits.

7. LABORATORY BLANK SPIKES

- Blank Spikes

Blank spikes (organics) were prepared and analyzed at the required frequency.

 X Yes

 No

Blank spike recoveries were within control limits.

 X Yes

 No

8. SURROGATE SPIKES

- Surrogate Spikes

Surrogate spikes were prepared and analyzed at the required frequency.

 X Yes

 No

Surrogate spike recoveries were within control limits.

 X Yes

 No

9. MATRIX SPIKE /MATRIX SPIKE DUPLICATES (MS/MSD)

- Matrix spike samples were analyzed at the proper frequency.

 X Yes

 No

Matrix spike recoveries were within control limits.

 X Yes

 No

- Matrix spike duplicate samples were analyzed at the proper frequency.

 X Yes

 No

Matrix spike duplicate RPD's were within control limits.

 Yes

 X No (Notes)

NOTES: Matrix spike duplicate samples had one QC exceedance. This exceedances is only noted and no flagging of the associated data occurs.

10. INTERPARAMETER RELATIONSHIPS

- The following relationships have been checked for all data from the December 2008 monitoring:

☒ Lab SC versus field SC

☒ Lab pH versus field pH

Lab SC versus field SC: A comparison of the field and lab SCs using a percent difference (%D) criteria for evaluation purposes, showed that none of the SC pairs exceeded the ten percent comparison criteria.

Lab pH versus field pH: A comparison of the field and lab pHs using a percent difference (%D) criteria for evaluation purposes, showed that none of the pH pairs exceeded the ten percent comparison criteria.

11. HISTORICAL COMPARISON

Current sampling event data (December 2008) were compared to historical data (December 2005 through November 2008). The data for the December 2008 sampling event was similar to historic data.

12. DATA QUALITY OBJECTIVES

- Project data quality objectives (DQO's) met.

☒ Yes

☐ No

Accuracy

Accuracy for this project is the agreement between a measured value and a true value and is measured by the recoveries on the laboratory matrix spikes and laboratory control samples.

Accuracy for this sampling event was 100 percent.

Precision

Precision for this project is the degree of variability between duplicate measurements. Laboratory analytical variability is measured by laboratory duplicates; field duplicates are a measure of overall variability in both field sampling and laboratory techniques.

Laboratory precision was 99 percent for this sampling event.

Field precision was 99 percent for this sampling event.

Completeness

The target completeness for this project is 90 percent of the measurements valid (not rejected). This percentage is based on the number of valid measurements compared to the number of planned measurements.

Completeness for this sampling event was 100 percent.

DATA VALIDATION REPORT

Prepared by: Ericka Vallance

REFERENCES

- Hem, J.D., 1992. Study and Interpretation of the Chemical Characteristics of Natural Water, 3rd Edition. US Geological Survey Water Supply Paper 2254.
- Hydrometrics Project Work Plan. Sampling and Analysis Plan City of Helena Landfill Groundwater Monitoring Activities, March 2008.
- U.S. Environmental Protection Agency, 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. November 2002.
- U.S. Environmental Protection Agency, 1990. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition.
- U.S. Environmental Protection Agency, 1993. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. October 2004.
- U.S. Environmental Protection Agency, 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. October 2004.

APPENDIX 1

TABLES

TABLE 1.

DATA VALIDATION CODES AND DEFINITIONS

<u>CODE</u>	<u>DEFINITION</u>
J	- The associated numerical value is an estimated quantity because quality control criteria were not met.
U	- Blank contamination. Indicates possible high bias and / or false positive. The associated value is an estimate.
R	- Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.
A	- Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code.)

SITE CODE	SAMPLE NUMBER	LAB NUMBER	SAMPLE DATE	PARAMETERS	RESULT	FLAGS	EXCEEDANCE TYPE
HL-90-1	HL-0812-102	8120134003	12/11/08	CHLOROFORM	0.0011	UJ1	BLANK
HL-94-3	HL-0812-106	8120134007	12/11/08	CHLOROFORM	0.0021	UJ1	BLANK
HL-99-2	HL-0812-107	8120134008	12/11/08	CHLOROFORM	0.002	UJ1	BLANK
HL-99-1	HL-0812-108	8120134009	12/11/08	CHLOROFORM	0.0025	UJ1	BLANK

NOTES: All quantities in mg/L (Water) or mg/kg (Soil) unless noted. RPD: Relative Percent Difference.
>PRDL: QC Values within +/- Contract Detection Limit (+/- 2 times CRDL for Soil) for values <5 times Contract Detection Limit.
FLAGS: A: Anomalous, UJ1: Blank, J2: Standard, J3: Holding Time, J4D: Duplicate Exceedance, J4K: Spike Exceedance, J4S: Split Exceedance,
J5: QC Omission, R: Rejected, T: Frequency Violation. U: In front of flag less than detection limit.

TABLE 3.0

SUMMARY OF THE COMPARISON OF SAMPLING PERIOD DATA TO THE DATABASE PERIOD DATA, SHOWING PARAMETERS THAT ARE HIGHEST OR LOWEST OR THREE OR MORE STANDARD DEVIATIONS FROM THE MEAN OF THE DATABASE PERIOD AND THE RELATIONSHIP TO THESE DATA

DataMan Program

CITY OF HELENA historical comparison

SITE	SAMPLE DATE	RESULT mg/L PARAMETER	COMPARISON		MIN (mg/L)	MEAN (mg/L)	MAX (mg/L)	STD DEVS FROM MEAN	RELATION TO DATABASE PERIOD
			DATABASE PERIOD	N					
5	12/10/2008	0.002 CHLOROFORM	12/09/2005-07/31/2008	12	0.0023	0.0027	0.0033	2.04	LOWEST
HL-06-1	12/11/2008	69.0 SULFATE (SO4)	12/12/2006-06/17/2008	4	86.0	141.5000	231.0	1.15	LOWEST
HL-90-1	12/11/2008	65.0 CHLORIDE (CL)	12/13/2006-12/20/2007	3	41	48.0000	56.0	2.25	HIGHEST
		8.25 NITRATE + NITRITE AS N	12/13/2006-12/20/2007	3	8.4	8.6200	8.76	1.92	LOWEST
		0.0011 CHLOROFORM	03/24/2006-06/18/2008	6	0.0012	0.0015	0.002	1.54	LOWEST
		2.0 CHEMICAL OXYGEN DEMAND	12/13/2006-12/20/2007	3	3	4.0000	5.0	2.00	LOWEST
HL-94-1	12/10/2008	0.0052 CHLOROFORM	12/08/2005-06/18/2008	6	0.0063	0.0199	0.036	1.17	LOWEST
HL-99-1	12/11/2008	8.77 NITRATE + NITRITE AS N	12/09/2005-06/19/2008	5	8.9	9.2440	9.6	1.84	LOWEST
		0.02 ZINC (ZN) DIS	12/09/2005-06/19/2008	5	<0.01		<0.01		HIGHEST
		0.0025 CHLOROFORM	12/09/2005-06/19/2008	9	0.0028	0.0034	0.0041	2.39	LOWEST
HL-99-2	12/11/2008	130.0 SULFATE (SO4)	12/09/2005-06/19/2008	5	103.0	114.0000	120.0	2.36	HIGHEST
HL-99-3	12/11/2008	8.22 NITRATE + NITRITE AS N	12/08/2005-06/19/2008	6	8.9	9.1333	9.4	4.42	LOWEST
MPC-5	12/11/2008	820.0 SULFATE (SO4)	12/09/2005-06/18/2008	6	962.0	1054.1667	1350.0	1.60	LOWEST
		24.0 CHLORIDE (CL)	12/09/2005-06/18/2008	6	31.0	63.1667	120.0	1.15	LOWEST
		17.3 NITRATE + NITRITE AS N	12/09/2005-06/18/2008	6	18.8	45.5333	73.0	1.57	LOWEST
		0.02 COPPER (CU) DIS	12/09/2005-06/18/2008	6	<0.01		0.02		HIGHEST
		35.0 CHEMICAL OXYGEN DEMAND	12/09/2005-06/18/2008	6	36	45.0000	58	1.09	LOWEST

NOTES: All quantities in mg/L (Water) or mg/kg (Soil) unless noted. All results LABORATORY unless field (FLD) or calculated (CALC).
 N: Number of samples in comparison data set; 50% of data set must be above lab detection limit before mean, median, & SD calculation.
 A & R Flags were excluded from Statistics The detection limit was used in calculations.

APPENDIX 2

DATABASE

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
8	5	350 Custer Ave - S. Colvin	Private Well		
8	16	3 Parr Court - Mark Erickson	Private Well		
2	82-3	82-3	Monitoring Wells	3973.51	87
2	83-7	83-7	Monitoring Wells		40.0
2	EPA-1	EPA-1	Monitoring Wells	3981.08	59
2	EPA-2	EPA-2	Monitoring Wells	3987.21	
2	EPA-4	EPA-4	Monitoring Wells	3973.83	
2	HL-06-1	HL-06-1 (REPLACED WELL 83-6)	Monitoring Wells		
2	HL-90-1	HL-90-1	Monitoring Wells	3942.48	68.0
4	HL-90-2	HL-90-2	Monitoring Wells	3950.96	68
4	HL-90-3	HL-90-3	Monitoring Wells	3958.29	79
4	HL-94-1	HL-94-1	Monitoring Wells	3994.04	
4	HL-94-2	HL-94-2	Monitoring Wells		
4	HL-94-3	HL-94-3	Monitoring Wells		
4	HL-99-1	HL-99-1	Monitoring Wells		
6	HL-99-2	HL-99-2	Monitoring Wells		
6	HL-99-3	HL-99-3	Monitoring Wells		
1	I-1	HL-11	Irrigation Well	3899.59	
6	I-4	I-4	Monitoring Wells	3923.7	
1	INF. GALLERY	INF. GALLERY	Irrigation Well	3918.89	
6	MPC-1	MPC-1 (was MPC-HL-1)	Monitoring Wells	3946.08	
6	MPC-2	MPC-2 (was MPC-HL-2)	Monitoring Wells	3936.09	
6	MPC-5	MPC-5	Monitoring Wells		
10	RINSBLANK	RINSATE BLANK	Quality Control		
10	TRIPBLANK	TRIP BLANK	Quality Control		

Sample Type: Irrigation Well

SITE CODE	I-1	INF. GALLERY
SAMPLE DATE	12/10/2008	12/10/2008
SAMPLE TIME	11:10	09:42
LAB	HYDRO	HYDRO
LAB NUMBER		
REMARKS	NO SAMPLE	NO SAMPLE
SAMPLE NUMBER	HL-0812-119	HL-0812-121

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	66.61	8.09
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APPENDIX 1

DATABASE

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: Monitoring Wells

SITE CODE	82-3	83-7	EPA-1	EPA-2	EPA-4	HL-06-1	HL-90-1
SAMPLE DATE	12/10/2008	12/10/2008	12/10/2008	12/10/2008	12/10/2008	12/11/2008	12/11/2008
SAMPLE TIME	08:55	09:15	09:18	09:22	09:05	12:45	09:30
LAB	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	EL	EL
LAB NUMBER						8120134006	8120134003
REMARKS	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE		
SAMPLE NUMBER	HL-0812-112	HL-0812-113	HL-0812-114	HL-0812-115	HL-0812-116	HL-0812-105	HL-0812-102

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	67.46	DRY	48.86	DRY	71.28	18.74	58.69
PH (FLD)						6.66	6.72
PH						6.9	7.4
SC (UMHOS/CM AT 25 C)						1160.0	1070.0
SC (UMHOS/CM AT 25 C) (FLD)						1185.0	1026.0
WATER TEMPERATURE (C) (FLD)						13.1	8.2

-- MAJOR CONSTITUENTS --

SULFATE (SO4)		
CHLORIDE (CL)	69.0	140.0
	28.0	65.0

-- NUTRIENTS --

NITRATE + NITRITE AS N		
	1.2	8.25

-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.005	<0.005
ARSENIC (AS) DIS	<0.005	<0.005
BARIUM (BA) DIS	<0.1	<0.1
BERYLLIUM (BE) DIS	<0.001	<0.001
CADMIUM (CD) DIS	<0.001	<0.001
CHROMIUM (CR) DIS	<0.01	<0.01
COBALT (CO) DIS	<0.01	<0.01
COPPER (CU) DIS	<0.01	<0.01
IRON (FE) DIS	<0.03	<0.03
LEAD (PB) DIS	<0.01	<0.01
MERCURY (HG) DIS	<0.001	<0.001
NICKEL (NI) DIS	<0.01	<0.01
SELENIUM (SE) DIS	<0.005	<0.005
SILVER (AG) DIS	<0.005	<0.005
THALLIUM (TL) DIS	<0.005	<0.005
VANADIUM (V) DIS	<0.1	<0.1
ZINC (ZN) DIS	<0.01	<0.01

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	0.005	<0.001
1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	0.0019
1,1-DICHLOROETHENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2-HEXANONE	<0.02	<0.02
ACETONE	<0.02	<0.02
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested
 Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;
 R: Rejected.

Sample Type: Monitoring Wells

SITE CODE	82-3	83-7	EPA-1	EPA-2	EPA-4	HL-06-1	HL-90-1
SAMPLE DATE	12/10/2008	12/10/2008	12/10/2008	12/10/2008	12/10/2008	12/11/2008	12/11/2008
SAMPLE TIME	08:55	09:15	09:18	09:22	09:05	12:45	09:30
LAB	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	EL	EL
LAB NUMBER						8120134006	8120134003
REMARKS	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE		
SAMPLE NUMBER	HL-0812-112	HL-0812-113	HL-0812-114	HL-0812-115	HL-0812-116	HL-0812-105	HL-0812-102

-- VOLATILE ORGANICS --

CARBON TETRACHLORIDE						<0.001	<0.001
CHLOROBENZENE						<0.001	<0.001
CHLORODIBROMOMETHANE						<0.001	<0.001
CHLOROETHANE						<0.001	<0.001
CHLOROFORM						<0.001	0.0011
							UJ1
CHLOROMETHANE						<0.001	<0.001
CIS-1,2-DICHLOROETHENE						<0.001	0.0011
CIS-1,3-DICHLOROPROPENE						<0.001	<0.001
DIBROMOMETHANE						<0.001	<0.001
DICHLORODIFLUOROMETHANE						<0.001	<0.001
ETHYLBENZENE						<0.001	<0.001
IODOMETHANE						<0.001	<0.001
TOTAL XYLENE						<0.001	<0.001
M-P XYLENE						<0.001	<0.001
O-XYLENE						<0.001	<0.001
METHYL ETHYL KETONE						<0.02	<0.02
METHYL ISOBUTYL KETONE						<0.02	<0.02
METHYLENE CHLORIDE						<0.001	<0.001
STYRENE						<0.001	<0.001
TETRACHLOROETHENE						<0.001	0.0054
TOLUENE						<0.001	<0.001
TRANS-1,2-DICHLOROETHENE						<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE						<0.001	<0.001
TRICHLOROETHENE						<0.001	0.0012
TRICHLOROFUOROMETHANE						<0.001	<0.001
VINYL ACETATE						<0.001	<0.001
VINYL CHLORIDE						<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE						<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE						<0.001	<0.001
1,2-DICHLOROBENZENE						<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE						<0.001	<0.001
1,4-DICHLOROBENZENE						<0.001	<0.001

-- OTHER PARAMETERS --

CYANIDE (CN) TOT						<0.005	<0.005
CHEMICAL OXYGEN DEMAND						<1.0	2.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
 R:Rejected.

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-2	HL-90-3	HL-94-1	HL-94-2	HL-94-3	HL-99-1
SAMPLE DATE	12/11/2008	12/10/2008	12/10/2008	12/10/2008	12/10/2008	12/10/2008	12/11/2008
SAMPLE TIME	10:00	09:38	09:12	12:30	09:32	09:45	14:30
LAB	EL	HYDRO	HYDRO	EL	HYDRO	HYDRO	EL
LAB NUMBER	8120134004			8120134002			8120134009
REMARKS	DUPLICATE	NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	
SAMPLE NUMBER	HL-0812-103	HL-0812-117	HL-0812-125	HL-0812-101	HL-0812-118	HL-0812-124	HL-0812-108

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)		50.92	62.56	60.04	30.18	55.15	58.56
PH (FLD)				7.26			7.14
PH	7.4			7.4			7.2
SC (UMHOS/CM AT 25 C)	1080.0			975.0			1130.0
SC (UMHOS/CM AT 25 C) (FLD)				983.0			1167.0
WATER TEMPERATURE (C) (FLD)				10.6			10.7

-- MAJOR CONSTITUENTS --

SULFATE (SO4)	140.0			89.0			160.0
CHLORIDE (CL)	66.0			22.0			64.0

-- NUTRIENTS --

NITRATE + NITRITE AS N	8.3			3.74			8.77
------------------------	-----	--	--	------	--	--	------

-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.005			<0.005			<0.005
ARSENIC (AS) DIS	<0.005			<0.005			<0.005
BARIUM (BA) DIS	<0.1			<0.1			<0.1
BERYLLIUM (BE) DIS	<0.001			<0.001			<0.001
CADMIUM (CD) DIS	<0.001			<0.001			<0.001
CHROMIUM (CR) DIS	<0.01			<0.01			<0.01
COBALT (CO) DIS	<0.01			<0.01			<0.01
COPPER (CU) DIS	<0.01			<0.01			<0.01
IRON (FE) DIS	<0.03			<0.03			<0.03
LEAD (PB) DIS	<0.01			<0.01			<0.01
MERCURY (HG) DIS	<0.001			<0.001			<0.001
NICKEL (NI) DIS	<0.01			<0.01			<0.01
SELENIUM (SE) DIS	<0.005			<0.005			<0.005
SILVER (AG) DIS	<0.005			<0.005			<0.005
THALLIUM (TL) DIS	<0.005			<0.005			<0.005
VANADIUM (V) DIS	<0.1			<0.1			<0.1
ZINC (ZN) DIS	<0.01			<0.01			0.02

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001			<0.001			<0.001
1,1,1-TRICHLOROETHANE	<0.001			<0.001			<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001			<0.001			<0.001
1,1,2-TRICHLOROETHANE	<0.001			<0.001			<0.001
1,1-DICHLOROETHANE	0.0019			<0.001			<0.001
1,1-DICHLOROETHENE	<0.001			<0.001			<0.001
1,2-DIBROMOETHANE	<0.001			<0.001			<0.001
1,2-DICHLOROETHANE	<0.001			<0.001			<0.001
1,2-DICHLOROPROPANE	<0.001			<0.001			<0.001
2-HEXANONE	<0.02			<0.02			<0.02
ACETONE	<0.02			<0.02			<0.02
ACRYLONITRILE	<0.02			<0.02			<0.02
BENZENE	<0.001			<0.001			<0.001
BROMOCHLOROMETHANE	<0.001			<0.001			<0.001
BROMODICHLOROMETHANE	<0.001			<0.001			<0.001
BROMOFORM	<0.001			<0.001			<0.001
BROMOMETHANE	<0.001			<0.001			<0.001
CARBON DISULFIDE	<0.001			<0.001			<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)

TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested

Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;

R: Rejected.

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-2	HL-90-3	HL-94-1	HL-94-2	HL-94-3	HL-99-1
SAMPLE DATE	12/11/2008	12/10/2008	12/10/2008	12/10/2008	12/10/2008	12/10/2008	12/11/2008
SAMPLE TIME	10:00	09:38	09:12	12:30	09:32	09:45	14:30
LAB	EL	HYDRO	HYDRO	EL	HYDRO	HYDRO	EL
LAB NUMBER	8120134004			8120134002			8120134009
REMARKS	DUPLICATE	NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	
SAMPLE NUMBER	HL-0812-103	HL-0812-117	HL-0812-125	HL-0812-101	HL-0812-118	HL-0812-124	HL-0812-108
-- VOLATILE ORGANICS --							
CARBON TETRACHLORIDE	<0.001			<0.001			<0.001
CHLOROBENZENE	<0.001			<0.001			<0.001
CHLORODIBROMOMETHANE	<0.001			<0.001			<0.001
CHLOROETHANE	<0.001			<0.001			<0.001
CHLOROFORM	0.0011			0.0052			0.0025
							UJ1
CHLOROMETHANE	<0.001			<0.001			<0.001
CIS-1,2-DICHLOROETHENE	0.001			<0.001			0.0018
CIS-1,3-DICHLOROPROPENE	<0.001			<0.001			<0.001
DIBROMOMETHANE	<0.001			<0.001			<0.001
DICHLORODIFLUOROMETHANE	<0.001			<0.001			<0.001
ETHYLBENZENE	<0.001			<0.001			<0.001
IODOMETHANE	<0.001			<0.001			<0.001
TOTAL XYLENE	<0.001			<0.001			<0.001
M-P XYLENE	<0.001			<0.001			<0.001
O-XYLENE	<0.001			<0.001			<0.001
METHYL ETHYL KETONE	<0.02			<0.02			<0.02
METHYL ISOBUTYL KETONE	<0.02			<0.02			<0.02
METHYLENE CHLORIDE	<0.001			<0.001			<0.001
STYRENE	<0.001			<0.001			<0.001
TETRACHLOROETHENE	0.0059			<0.001			0.0037
TOLUENE	<0.001			<0.001			<0.001
TRANS-1,2-DICHLOROETHENE	<0.001			<0.001			<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001			<0.001			<0.001
TRICHLOROETHENE	0.0012			<0.001			<0.001
TRICHLOROFLUOROMETHANE	<0.001			<0.001			<0.001
VINYL ACETATE	<0.001			<0.001			<0.001
VINYL CHLORIDE	<0.001			<0.001			<0.001
-- SEMI-VOLATILE EXTRACTABLES --							
1,2,3-TRICHLOROPROPANE	<0.001			<0.001			<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001			<0.001			<0.001
1,2-DICHLOROBENZENE	<0.001			<0.001			<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.001			<0.001			<0.001
1,4-DICHLOROBENZENE	<0.001			<0.001			<0.001
-- OTHER PARAMETERS --							
CYANIDE (CN) TOT	<0.005			<0.005			<0.005
CHEMICAL OXYGEN DEMAND	1.0			6.0			2.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
 Validation flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
 R:Rejected.

Sample Type: Monitoring Wells

SITE CODE	HL-99-2	HL-99-3	I-4	MPC-1	MPC-2	MPC-5
SAMPLE DATE	12/11/2008	12/11/2008	12/10/2008	12/10/2008	12/10/2008	12/11/2008
SAMPLE TIME	14:00	13:30	00:00	10:58	10:55	10:45
LAB	EL	EL	HYDRO	HYDRO	HYDRO	EL
LAB NUMBER	8120134008	8120134007				8120134005
REMARKS			NO SAMPLE	NO SAMPLE	NO SAMPLE	
SAMPLE NUMBER	HL-0812-107	HL-0812-106	HL-0812-120	HL-0812-122	HL-0812-123	HL-0812-104
-- PHYSICAL PARAMETERS --						
DEPTH TO WATER LEVEL (FEET)	59.61	55.15	WINTERIZED	24.52	18.5	57.2
PH (FLD)	7.31	7.47				6.78
PH	7.3	7.3				7.0
SC (UMHOS/CM AT 25 C)	887.0	902.0				2880.0
SC (UMHOS/CM AT 25 C) (FLD)	926.0	924.0				2987.0
WATER TEMPERATURE (C) (FLD)	11.2	11.1				11.7
-- MAJOR CONSTITUENTS --						
SULFATE (SO4)	130.0	150.0				820.0
CHLORIDE (CL)	42.0	49.0				24.0
-- NUTRIENTS --						
NITRATE + NITRITE AS N	7.49	8.22				17.3
-- METALS & MINOR CONSTITUENTS --						
ANTIMONY (SB) DIS	<0.005	<0.005				<0.005
ARSENIC (AS) DIS	<0.005	<0.005				0.006
BARIUM (BA) DIS	<0.1	<0.1				<0.1
BERYLLIUM (BE) DIS	<0.001	<0.001				<0.001
CADMIUM (CD) DIS	<0.001	<0.001				<0.001
CHROMIUM (CR) DIS	<0.01	<0.01				<0.01
COBALT (CO) DIS	<0.01	<0.01				<0.01
COPPER (CU) DIS	<0.01	<0.01				0.02
IRON (FE) DIS	<0.03	0.26				1.69
LEAD (PB) DIS	<0.01	<0.01				<0.01
MERCURY (HG) DIS	<0.001	<0.001				<0.001
NICKEL (NI) DIS	<0.01	<0.01				0.02
SELENIUM (SE) DIS	<0.005	<0.005				0.007
SILVER (AG) DIS	<0.005	<0.005				<0.005
THALLIUM (TL) DIS	<0.005	<0.005				<0.005
VANADIUM (V) DIS	<0.1	<0.1				<0.1
ZINC (ZN) DIS	<0.01	<0.01				<0.01
-- VOLATILE ORGANICS --						
1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001				<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001				<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001				<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001				<0.001
1,1-DICHLOROETHANE	0.003	0.002				<0.001
1,1-DICHLOROETHENE	<0.001	<0.001				<0.001
1,2-DIBROMOETHANE	<0.001	<0.001				<0.001
1,2-DICHLOROETHANE	<0.001	<0.001				<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001				<0.001
2-HEXANONE	<0.02	<0.02				<0.02
ACETONE	<0.02	<0.02				<0.02
ACRYLONITRILE	<0.02	<0.02				<0.02
BENZENE	<0.001	<0.001				0.0013
BROMOCHLOROMETHANE	<0.001	<0.001				<0.001
BROMODICHLOROMETHANE	<0.001	<0.001				<0.001
BROMOFORM	<0.001	<0.001				<0.001
BROMOMETHANE	<0.001	<0.001				<0.001
CARBON DISULFIDE	<0.001	<0.001				<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested
 Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;
 R: Rejected.

Sample Type: Monitoring Wells

SITE CODE	HL-99-2	HL-99-3	I-4	MPC-1	MPC-2	MPC-5
SAMPLE DATE	12/11/2008	12/11/2008	12/10/2008	12/10/2008	12/10/2008	12/11/2008
SAMPLE TIME	14:00	13:30	00:00	10:58	10:55	10:45
LAB	EL	EL	HYDRO	HYDRO	HYDRO	EL
LAB NUMBER	8120134008	8120134007				8120134005
REMARKS			NO SAMPLE	NO SAMPLE	NO SAMPLE	
SAMPLE NUMBER	HL-0812-107	HL-0812-106	HL-0812-120	HL-0812-122	HL-0812-123	HL-0812-104
-- VOLATILE ORGANICS --						
CARBON TETRACHLORIDE	<0.001	<0.001				<0.001
CHLOROBENZENE	<0.001	<0.001				<0.001
CHLORODIBROMOMETHANE	<0.001	<0.001				<0.001
CHLOROETHANE	<0.001	<0.001				<0.001
CHLOROFORM	0.002	0.0021				<0.001
	UJ1	UJ1				
CHLOROMETHANE	<0.001	<0.001				<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001				<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001				<0.001
DIBROMOMETHANE	<0.001	<0.001				<0.001
DICHLORODIFLUOROMETHANE	0.0029	0.0012				<0.001
ETHYLBENZENE	<0.001	<0.001				<0.001
IODOMETHANE	<0.001	<0.001				<0.001
TOTAL XYLENE	<0.001	<0.001				0.0012
M-P XYLENE	<0.001	<0.001				<0.001
O-XYLENE	<0.001	<0.001				<0.001
METHYL ETHYL KETONE	<0.02	<0.02				<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02				<0.02
METHYLENE CHLORIDE	<0.001	<0.001				<0.001
STYRENE	<0.001	<0.001				<0.001
TETRACHLOROETHENE	0.0064	0.0053				<0.001
TOLUENE	<0.001	<0.001				<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001				<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001				<0.001
TRICHLOROETHENE	0.0012	<0.001				<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001				<0.001
VINYL ACETATE	<0.001	<0.001				<0.001
VINYL CHLORIDE	<0.001	<0.001				<0.001
-- SEMI-VOLATILE EXTRACTABLES --						
1,2,3-TRICHLOROPROPANE	<0.001	<0.001				<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001				<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001				<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.001	<0.001				<0.001
1,4-DICHLOROBENZENE	<0.001	<0.001				<0.001
-- OTHER PARAMETERS --						
CYANIDE (CN) TOT	<0.005	0.031				5.0
CHEMICAL OXYGEN DEMAND	<1.0	<1.0				35.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)

TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested

Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;

R:Rejected.

Sample Type: Private Well

SITE CODE	5	16
SAMPLE DATE	12/10/2008	12/18/2008
SAMPLE TIME	11:10	17:00
LAB	EL	EL
LAB NUMBER	8120134001	8120197001
SAMPLE NUMBER	HL-0812-100	HL-0812-110

-- PHYSICAL PARAMETERS --

PH (FLD)	7.47	6.94
SC (UMHOS/CM AT 25 C) (FLD)	1215.0	1098.0
WATER TEMPERATURE (C) (FLD)	11.5	9.5

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2-HEXANONE	<0.02	<0.02
ACETONE	<0.02	<0.02
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001
CHLORODIBROMOMETHANE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	0.002	0.0013
CHLOROMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
TOTAL XYLENE	<0.001	<0.001
M-P XYLENE	<0.001	<0.001
O-XYLENE	<0.001	<0.001
METHYL ETHYL KETONE	<0.02	<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	0.0029	0.001
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)

TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested

Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;

R:Rejected.

Sample Type: Private Well

SITE CODE	5	16
SAMPLE DATE	12/10/2008	12/18/2008
SAMPLE TIME	11:10	17:00
LAB	EL	EL
LAB NUMBER	8120134001	8120197001
SAMPLE NUMBER	HL-0812-100	HL-0812-110

-- SEMI-VOLATILE EXTRACTABLES --

1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.001	<0.001
1,4-DICHLOROBENZENE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested
 Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;
 R: Rejected.

Sample Type: Quality Control

SITE CODE	RINSBLANK	TRIPBLANK
SAMPLE DATE	12/11/2008	12/11/2008
SAMPLE TIME	15:10	15:10
LAB	BL	EL
LAB NUMBER	8120134010	8120134011
REMARKS	BLANK	BLANK
SAMPLE NUMBER	HL-0812-109	HL-0812-111

-- PHYSICAL PARAMETERS --

PH	5.7
SC (UMHOS/CM AT 25 C)	2.0

-- MAJOR CONSTITUENTS --

SULFATE (SO4)	<1.0
CHLORIDE (CL)	<1.0

-- NUTRIENTS --

NITRATE + NITRITE AS N	0.06
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-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.005
ARSENIC (AS) DIS	<0.005
BARIUM (BA) DIS	<0.1
BERYLLIUM (BE) DIS	<0.001
CADMIUM (CD) DIS	<0.001
CHROMIUM (CR) DIS	<0.01
COBALT (CO) DIS	<0.01
COPPER (CU) DIS	<0.01
IRON (FE) DIS	<0.03
LEAD (PB) DIS	<0.01
MERCURY (HG) DIS	<0.001
NICKEL (NI) DIS	<0.01
SELENIUM (SE) DIS	<0.005
SILVER (AG) DIS	<0.005
THALLIUM (TL) DIS	<0.005
VANADIUM (V) DIS	<0.1
ZINC (ZN) DIS	<0.01

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2-HEXANONE	<0.02	<0.02
ACETONE	<0.02	<0.02
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	0.0042	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001
CHLORODIBROMOMETHANE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
 R:Rejected.

Sample Type: Quality Control

SITE CODE	RINSBLANK	TRIPBLANK
SAMPLE DATE	12/11/2008	12/11/2008
SAMPLE TIME	15:10	15:10
LAB	EL	EL
LAB NUMBER	8120134010	8120134011
REMARKS	BLANK	BLANK
SAMPLE NUMBER	HL-0812-109	HL-0812-111

-- VOLATILE ORGANICS --

CHLOROPFORM	0.019	<0.001
CHLOROMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
TOTAL XYLENE	<0.001	<0.001
M-P XYLENE	<0.001	<0.001
O-XYLENE	<0.001	<0.001
METHYL ETHYL KETONE	<0.02	<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001
TRICHLORODIFLUOROMETHANE	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.001	<0.001
1,4-DICHLOROBENZENE	<0.001	<0.001

-- OTHER PARAMETERS --

CYANIDE (CN) TOT	<0.005
CHEMICAL OXYGEN DEMAND	<1.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
 R:Rejected.

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APPENDIX 3

HYDROMETRICS FIELD NOTES

WATER SAMPLING FORM

HF-FORM-430

Project Name: City of Helena

Project Code: 1273

Sample Team Member(s): R. Lane

Laboratory Used: Energy Labs

Site Designation: site #5 Colvin

Sample Code Number: HL-0812-100

Sample Date: 12/10/08

Sample Time: 1110 (military)

If Duplicate Sample Collected,Please Record Below

Duplicate Sample Code #:

Duplicate Sample Time:

Site ConditionsNew Site: Yes ☐ No ☒ Photo taken: Yes ☐ No ☒

Site Type: DRY surface water process water

monitoring well domestic well adit seep

spring other:

Weather Conditions: calm breeze windy

no precip. rain snow

clear p. cloudy overcast

Air Temperature: 44 °F

For Groundwater Sampleswell volume formula: $V = (TD-SWL) \times (\text{Dia.}^2)$

25

Comments

TD (ft.) Pumping Rate gpm

SWL (ft.) no access/pumping

Casing Diameter (I.D.)

Water Volume (V) (gal): $V \times 3 = (\text{gal})$

MP Description

Actual Vol. Removed (gal.)

Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate

Other Flow or Description:

Flow: gpm cfs

Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
1110			7.47	1215		11.5	

Turbidity: clear ☒ moderate
(circle) slight verySample Method: grab ☒ composite pump bailer other
(describe)Field Parameters

Sample Duplicate

ORP (mV)		
DO (mg/l)		
pH	7.47	
SC (µmhos/cm)	1215	
Turbidity (ntu)		
H ₂ O Tmp. (°C)	11.5	
Color	None	
Other; odor	None	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
2	40mL	UF	HCL	VOC	

Comments:

Sample Team Member Signature: R. Lane

Page of

STANDARD OPERATING PROCEDURE

WATER SAMPLING FORM

HF-FORM-430

Project Name: City of Helena
 Project Code: 1273
 Sample Team Member(s): R, Lane
 Laboratory Used: Energy Labs

Site Designation: HL-94-1
 Sample Code Number: HL-0812-101
 Sample Date: 12/10/08
 Sample Time: 1230 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #: Duplicate Sample Time:

Site Conditions

New Site: Yes ☐ No ☒ Photo taken: Yes ☐ No ☒
 Site Type: DRY surface water process water

monitoring well domestic well adit seep

spring other: Weather Conditions: calm breeze windyno precip. rain snowclear pt. cloudy overcastAir Temperature: °C 46 °F

For Groundwater Samples

well volume $V = (TD-SWL) \times (\text{Dia.}^2)$
 formula: 25

Comments

TD (ft.) 88 Pumping Rate gpmSWL (ft.) 60.04 no access/pumpingCasing Diameter (I.D.) 2"Water Volume (V) (gal): 5 $V \times 3 = (\text{gal})$ 15MP Description Top of PVCActual Vol. Removed (gal.) 15Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir EstimateOther Flow or Description: Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
<u>1230</u>			<u>7.26</u>	<u>983</u>		<u>10.6</u>	

Turbidity: clear moderate
 (circle) slight very

Sample Method: grab composite pump bailer other
 (describe)

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH	<u>7.26</u>	
SC (µmhos/cm)	<u>983</u>	
Turbidity (ntu)		
H ₂ O Tmp. (°C)	<u>10.6</u>	
Color	<u>None</u>	
Other; odor	<u>None</u>	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
<u>2</u>	<u>40mL</u>	<u>UF</u>	<u>HCL</u>	<u>VOC</u>	
<u>1</u>	<u>500</u>	<u>UF</u>	<u>RAW</u>	<u>Commons</u>	
<u>1</u>	<u>250</u>	<u>F</u>	<u>HNO3</u>	<u>Dis Metals</u>	
<u>1</u>	<u>250</u>	<u>UF</u>	<u>H2SO4</u>	<u>Nut</u>	
<u>1</u>	<u>500</u>	<u>UF</u>	<u>NaOH3</u>	<u>CN</u>	

Comments: Sample Team Member Signature: Page of

WATER SAMPLING FORM

HF-FORM-430

Project Name: City of Helena

Project Code: 1273

Sample Team Member(s): R, Lane

Laboratory Used: Energy Labs

Site Designation: HL-90-1

Sample Code Number: HL-0812-102

Sample Date: 12/11/08

Sample Time: 0930 (military)

If Duplicate Sample Collected,
Please Record Below

Duplicate Sample Code #: HL-0812-103

Duplicate Sample Time: 1000

Site ConditionsNew Site: Yes ☐ No ☒ Photo taken: Yes ☐ No ☒
Site Type: DRY surface water process water

monitoring well domestic well adit seep

spring other:

Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast

Air Temperature: °C 34 °F

For Groundwater Sampleswell volume formula: $V = (TD-SWL) \times (Dia.^2)$
25

Comments

TD (ft.) 60 Pumping Rate _____ gpm

SWL (ft.) 58.64 no access/pumping

Casing Diameter (I.D.) 4"

Water Volume (V) (gal): 1 V x 3 = (gal) 3

MP Description Top of PVC

Actual Vol. Removed (gal.) 3

Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate

Other Flow or Description:

Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
0930			6.72	1026		8.2	

Turbidity: clear moderate
(circle) slight verySample Method: grab composite
(describe) pump bailer otherField Parameters

Sample Duplicate

ORP (mV)		
DO (mg/l)		
pH	6.72	
SC (µmhos/cm)	1026	
Turbidity (ntu)		
H ₂ O Tmp. (°C)	8.2	
Color	None	
Other; odor	None	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
2	40mL	UF	HCL	VOC	
1	500	UF	RAW	Commons	
1	250	F	HNO3	Dis Metals	
1	250	UF	H2SO4	Nut	
1	500	UF	NaOH3	CN	

Comments:

Sample Team Member Signature: R. Lane

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WATER SAMPLING FORM

HF-FORM-430

Project Name: City of Helena

Project Code: 1273

Sample Team Member(s): R. Lane

Laboratory Used: Energy Labs

Site Designation: MPC-5

Sample Code Number: HL-0812-104

Sample Date: 12/11/08

Sample Time: 1045 (military)

If Duplicate Sample Collected,
Please Record BelowDuplicate Sample Code #: Duplicate Sample Time: Site ConditionsNew Site: Yes ☐ No ☒ Photo taken: Yes ☐ No ☒

Site Type: DRY surface water process water

monitoring well domestic well adit seep

spring other:

Weather Conditions: calm breeze windy

no precip. rain snow

clear p. cloudy overcast

Air Temperature: °C 35 °F

For Groundwater Sampleswell volume $V = (TD-SWL) \times (Dia.^2)$
formula: 25

Comments

TD (ft.) 73.4 Pumping Rate gpm

SWL (ft.) 57.2 no access/pumping

Casing Diameter (I.D.) 2"

Water Volume (V) (gal): 3 $V \times 3 = (gal)$ 9

MP Description Top of PVC

Actual Vol. Removed (gal.)

Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate

Other Flow or Description: Flow: gpm cfs Staff Gauge: Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
1045			6.78	2987		11.7	

Turbidity: clear moderate
(circle) slight verySample Method: grab composite pump bailer other
(describe)Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH	6.78	
SC (µmhos/cm)	2987	
Turbidity (ntu)		
H ₂ O Tmp. (°C)	11.7	
Color	yellow	
Other; odor	gas	

Comments: Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
2	40mL	UF	HCL	VOC	
1	520	UF	RAW	Commons	
1	250	F	HNO3	Dis Metals	
1	250	UF	H2SO4	Nut	
1	500	UF	NaOH3	CN	

Sample Team Member Signature: R. LanePage of

WATER SAMPLING FORM

HF-FORM-430

Project Name: City of Helena

Project Code: 1273

Sample Team Member(s): R, Lane

Laboratory Used: Energy Labs

Site Designation: HL-06-1

Sample Code Number: HL-0812-105

Sample Date: 12/11/08

Sample Time: 1245 (military)

If Duplicate Sample Collected,Please Record Below

Duplicate Sample Code #: /

Duplicate Sample Time: /

Site ConditionsNew Site: Yes ☐ No ☒ Photo taken: Yes ☐ No ☒

Site Type: DRY surface water process water

monitoring well domestic well adit seep

spring other:

Weather Conditions: calm breeze windy

no precip. rain snow

clear p. cloudy overcast

Air Temperature: °C 40 °F

For Groundwater Sampleswell volume formula: $V = (TD-SWL) \times (\text{Dia.}^2) / 25$

Comments

TD (ft.) 26.5 Pumping Rate _____ gpm

SWL (ft.) 18.74 no access/pumping

Casing Diameter (I.D.) 3"

Water Volume (V) (gal): 1.3 V x 3 = (gal) 4

MP Description Top of PVC

Actual Vol. Removed (gal.) 5

Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate

Other Flow or Description:

Flow: _____ gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
1245			6.66	1185		13.1	

Turbidity: clear moderate
(circle) slight verySample Method: grab composite pump bailer other
(describe)Field Parameters

Sample Duplicate

ORP (mV)		
DO (mg/l)		
pH	6.66	
SC (µmhos/cm)	1185	
Turbidity (ntu)		
H ₂ O Tmp. (°C)	13.1	
Color	Brown	
Other; odor	None	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
2	40mL	UF	HCL	VOC	
1	500	UF	RAW	Commons	
1	250	F	HNO3	Dis Metals	
1	250	UF	H2SO4	Nut	
1	500	UF	NaOH3	CN	

Comments:

Sample Team Member Signature: R. J. 2

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STANDARD OPERATING PROCEDURE

WATER SAMPLING FORM

HF-FORM-430

Consulting Scientists,
Engineers and Contractors

Project Name: City of Helena
 Project Code: 1273
 Sample Team Member(s): R. Lane
 Laboratory Used: Energy Labs

Site Designation: HL-99-3
 Sample Code Number: HL-0812-106
 Sample Date: 12/11/08
 Sample Time: 1330 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
 Duplicate Sample Time:

Site Conditions

New Site: Yes ☐ No ☒ Photo taken: Yes ☐ No ☒
 Site Type: DRY surface water process water

monitoring well domestic well adit seep

spring other:

Weather Conditions: calm breeze windy
no precip rain snow
clear p. cloudy overcast

Air Temperature: °C 42 °F

For Groundwater Samples

well volume formula: $V = (TD-SWL) \times (\text{Dia.}^2) / 25$

Comments

TD (ft.) 105 Pumping Rate 16.0 gpm

SWL (ft.) 55.15' no access/pumping

Casing Diameter (I.D.)

Water Volume (V) (gal): $V \times 3 = (\text{gal})$

MP Description

Actual Vol. Removed (gal.)

Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate

Other Flow or Description:

Flow: gpm ofs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
<u>1330</u>			<u>7.47</u>	<u>924</u>		<u>11.1</u>	

Turbidity: clear moderate
 (circle) slight very

Sample Method: grab composite pump bailer other
 (describe)

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH	<u>7.47</u>	
SC (µmhos/cm)	<u>924</u>	
Turbidity (ntu)		
H ₂ O Tmp. (°C)	<u>11.1</u>	
Color	<u>None</u>	
Other; odor	<u>None</u>	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
<u>2</u>	<u>40mL</u>	<u>UF</u>	<u>HCL</u>	<u>VOC</u>	
<u>1</u>	<u>500</u>	<u>UF</u>	<u>RAW</u>	<u>Commons</u>	
<u>1</u>	<u>250</u>	<u>F</u>	<u>HNO3</u>	<u>Dis Metals</u>	
<u>1</u>	<u>250</u>	<u>UF</u>	<u>H2SO4</u>	<u>Nut</u>	
<u>1</u>	<u>500</u>	<u>UF</u>	<u>NaOH3</u>	<u>CN</u>	

Comments:

Sample Team Member Signature: R. Lane

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WATER SAMPLING FORM

HF-FORM-430

Project Name: City of Helena

Project Code: 1273

Sample Team Member(s): R. Lane

Laboratory Used: Energy Labs

Site Designation: HL-99-2

Sample Code Number: HL-0812-107

Sample Date: 12/11/08

Sample Time: 1400 (military)

If Duplicate Sample Collected,
Please Record Below

Duplicate Sample Code #:

Duplicate Sample Time:

Site ConditionsNew Site: Yes ☐ No ☒ Photo taken: Yes ☐ No ☒

Site Type: DRY surface water process water

monitoring well domestic well adit seep

spring other:

Weather Conditions: calm breeze windy

no precip rain snow

clear cloudy overcast

Air Temperature: °C 42 °F

For Groundwater Sampleswell volume formula: $V = (TD-SWL) \times (\text{Dia.}^2) / 25$

Comments

TD (ft.) 118 Pumping Rate _____ gpm

SWL (ft.): 59.61' no access/pumping

Casing Diameter (I.D.):

Water Volume (V) (gal): V x 3 = (gal)

MP Description

Actual Vol. Removed (gal):

Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate

Other Flow or Description:

Flow: gpm cfs

Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
1400			7.31	926		11.2	

Turbidity: clear moderate
(circle) slight verySample Method: grab composite pump bailer other
(describe)Field Parameters

Sample Duplicate

ORP (mV)		
DO (mg/l)		
pH	7.31	
SC (µmhos/cm)	926	
Turbidity (ntu)		
H ₂ O Tmp. (°C)	11.2	
Color	None	
Other; odor	None	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
2	40mL	UF	HCL	VOC	
1	500	UF	RAW	Commons	
1	250	F	HNO3	Dis Metals	
1	250	UF	H2SO4	Nut	
1	500	UF	NaOH3	CN	

Comments:

Sample Team Member Signature: R. Lane

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WATER SAMPLING FORM

HF-FORM-430

Project Name: City of Helena

Project Code: 1273

Sample Team Member(s): R, Lane

Laboratory Used: Energy Labs

Site Designation: HL-99-1

Sample Code Number: HL-0812-108

Sample Date: 12/11/08

Sample Time: 1430 (military)

**If Duplicate Sample Collected,
Please Record Below**

Duplicate Sample Code #: /

Duplicate Sample Time: /

Site ConditionsNew Site: Yes ☐ No ☒ Photo taken: Yes ☐ No ☒

Site Type: DRY surface water process water

monitoring well domestic well adit seep

spring other:

Weather Conditions: calm breeze windy

no precip. rain snow

clear p. cloudy overcast

Air Temperature: °C 42 °F

well volume formula: $V = (TD-SWL) \times (Dia^2)$

25

Comments

TD(ft.) 98 Pumping Rate gpm

SWL (ft.) 58.56 no access/pumping

Casing Diameter (I.D.)

Water Volume (V) (gal): V x 3 =(gal)

MP Description

Actual Vol. Removed (gal.)

Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate

Other Flow or Description:

Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (μmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
1430			7.14	1167		10.7	

Turbidity: clear moderate
(circle) slight verySample Method: grab composite pump bailer other
(describe)**Field Parameters**

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH	7.14	
SC (μmhos/cm)	1167	
Turbidity (ntu)		
H ₂ O Tmp. (°C)	10.7	
Color	None	
Other; odor	None	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
2	40mL	UF	HCL	VOC	
1	500	UF	RAW	Commons	
1	250	F	HNO3	Dis Metals	
1	250	UF	H2SO4	Nut	
1	500	UF	NaOH3	CN	

Comments:

Sample Team Member Signature: R-L

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WATER SAMPLING FORM

HF-FORM-430

Project Name: City of HelenaProject Code: 1273Sample Team Member(s): R, LaneLaboratory Used: Energy LabsSite Designation: Rising BlankSample Code Number: HL-0812-109Sample Date: 12/11/08Sample Time: 1510 (military)If Duplicate Sample Collected,
Please Record BelowDuplicate Sample Code #: Duplicate Sample Time: Site ConditionsNew Site: Yes ☐ No ☒ Photo taken: Yes ☐ No ☒Site Type: DRY surface water process water

monitoring well domestic well adit seep

spring other: Weather Conditions: calm breeze windyno precip. rain snowclear p. cloudy overcastAir Temperature: °C 47 °FFor Groundwater Samples

well volume formula: $V = (TD-SWL) \times (\text{Dia.})^2$	25	Comments
TD (ft.)	Pumping Rate	gpm
SWL (ft.)		no access/pumping
Casing Diameter (I.D.)		
Water Volume (V) (gal):	$V \times 3 =$ (gal)	
MP Description		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

For Surface Water Samples

Flow Method:	Marsh McBirney	Volumetric	Flume	Weir	Estimate
Other Flow or Description:					
Flow:	gpm	cfs	Staff Gage:		

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: clear moderate slight verySample Method: grab composite pump bailer otherField Parameters

Sample Duplicate

ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H ₂ O Tmp. (°C)		
Color		
Other; odor		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
2	40mL	UF	HCL	VOC	
1	500	UF	RAW	Commons	
1	250	F	HNO3	Dis Metals	
1	250	UF	H2SO4	Nut	
1	500	UF	NaOH3	CN	

Comments: Sample Team Member Signature: Rick Z

Page of

Sample Time: 1700 (military)

HF-FORM-430 (1/98)

December 2008 Ground Water Sampling

Water Levels

Site	Date	Time	SWL
82-3	12/10/08	8:55	67.46"
83-7		0915	Dry
EPA-1		0918	48.86"
EPA-2		0922	Dry
EPA-4		0905	71.28"
HL-90-2		0938	50.92"
HL-94-2		0932	30.18"
HL-94-3		1059	37.65"
I-1		1110	66.61"
I-4		—	NA
Infiltration Gallery		0942	8.04"
MPC-1		10:58	24.52"
MPC-2		10:55	18.50"
HL-94-1		09:28	60.04"
HL-06-1		10:30	18.79"
HL-99-1		0952	58.56"
HL-99-2		0949	59.61"
HL-90-1		0956	58.64"
HL-99-3		0945	55.15"
MPC-5		10:50	57.20"
HL-90-3		0912	62.56"

Site	Sample Code#	Vert Time	SOL TD	Bottles
Site #5	HL-0812	12/10/08	—	2/40/4F/HCL/VOL
Colvin	100	1110	—	
HL-94-1	HL-0812	12/10/08	60.04'	2/40/4F/HCL/VOL
	101	1230	88'	1/500/4F/RW/CONNS
				1/250/F/HNO ₃ /P.H.M.
				1/250/4F/H ₂ SO ₄ /UNT
				1/500/4F/NaOH/CN
HL-90-1	HL-0812	12/11/08	58.64'	
	102	0930	60'	
HL-90-1	HL-0812	12/11/08	—	
Dup	103	1000	—	
MPL-5	HL-0812	12/11/08	57.20'	
	104	1045	73.4'	
	* Had To Sample on top of order due to Construction.			
HL-06-1	HL-0812	12/11/08	18.74'	
	105	1245	26.5	

PH/Se/Temp

Comments

7.7 / 12.5 / 11.5

Ran 10 min and Sampled from Spigot on top of Well Head.

7.6 / 9.8 / 10.6

Purged 15 gal's with 12" Pump and Sampled

6.7 / 10.6 / 8.2

Purged and let Recover Several Times, Purged 3rd with 12" Disp Bailer.

Same

*

6.7 / 2.9 / 11.7

Purged 9 gal's with 2" RW Pump. Sampled For Inorganics. Sampled For Organics with 2" Disp Bailer

6.6 / 11.8 / 13.1

Pumped 5 gal's with RW Pump and Sampled 2" Disp Bailer for Organics Very Turbid Water

<u>Site</u>	<u>Sample</u>	<u>Time</u>	<u>TD</u>	<u>Bottles</u>
HL-99-3	HL-0812-	12/11/08	55.15'	Full Set
	106	1330	105'	

HL-99-2	HL-0812-	12/11/08	54.61'	
	107	1400	118'	

HL-99-1	HL-0812-	12/11/08	58.56'	
	108	1430	98'	

Rinsetc	HL-0812	12/11/08	—	
Blank	109	1510	—	

<u>Site</u>	<u>Sample</u>	<u>Time</u>	<u>TD</u>	<u>Bottles</u>

$$H_r = 3962.0$$

$$Flow = 16.5 \text{ pm}$$

$$T_1 = 684430$$

$$T_2 = 684434$$

Run Pump for 15 min
and Sampled.

$$H_r = 3124.5$$

$$Flow = 23.9 \text{ pm}$$

$$T_1 = 745948$$

$$T_2 = 144761$$

Run Pump for 15 min
and Sampled

$$H_r = 3462.5$$

$$Flow = 5.52$$

$$T_1 = 272051$$

$$T_2 = 720464$$

Run Pump for 15 min
and Sampled

Culligan DE Water Run through L 120
Pump and Sampled. Sampled for Organics
from DE Carboys

[illegible]

$\frac{pH}{Sc/T_{amp}}$
6.94 / 10.98 / 9.5

STANDARD OPERATING PROCEDURE INSTRUMENT CALIBRATION FORM HF-FORM-500

Project Name: City of HelenaProject Number: 1273Date: 12/10/08Personnel: R Lane

pH

Meter Type: YSISN: 04K17594AF

Time	Buffer	Temperature	Reading (Temp Corrected)
09 : 34	4	16.5	4.00
09 : 30	7	16.2	7.00
09 : 38	10	15.3	9.96
Calibration check:			

Weather Conditions:

calm	breeze	windy
no precip	rain	snow
clear	p. cloudy	overcast

IN LAB

Air Temperature:

°F

°C

Specific Conductance

Meter Type:	SN:			
Time	Standard	Temperature	Reading (Temp Corrected)	Cell Factor
09 : 20	1413	16.1	1413	—
Calibration check:				

Dissolved Oxygen

Meter Type: _____

SN: _____

Time: _____

Calibration Results: _____

Turbidity

Meter Type: _____

SN: _____

Standard: _____

Regulator: _____

Redox Potential (Eh)

Meter Type: _____

SN: _____

Electrode: _____

Reference: _____

Time: _____

Calibration Results: _____

Temperature: _____

PID/FID

Meter Type: _____

SN: _____

Spur Gas Type: _____

Time	Spur Gas	Calibration	Response	Reading
	Gas Pressure	Concentration	Volume	Factor
Calibration Check:				

Notes/Additional Information:

STANDARD OPERATING PROCEDURE INSTRUMENT CALIBRATION FORM HF-FORM-500

Project Name: City of HelenaProject Number: 1273Date: 12/11/08Personnel: R Lane**Weather Conditions:**

calm	breeze	windy
no precip	rain	snow
clear	p. cloudy	overcast

IN LAB

Air Temperature:

°F

°C

Dissolved Oxygen

Meter Type:

SN:

Date:

Calibration Results:

Redox Potential (Eh)

Meter Type:

SN:

Date:

Calibration Results:

Zincel, Salinity, Temperature:

Temperature:

pH

Meter Type: YSI

SN: 04K17594AF

Time	Buffer	Temperature	Reading (Temp Corrected)
07:48	4	14.6	4.00
07:44	7	14.4	7.00
07:53	10	13.6	9.99
Calibration check:			

Specific Conductance

Meter Type:

SN:

Time	Standard	Temperature	Reading (Temp Corrected)	Cell Factor
07:40	1413	14.1	1413	—
Calibration check:				

Turbidity

Meter Type:

SN:

PID/FID

Meter Type:

SN:

Time	Sample	Calibration	Response	Reading
	Gas Pressure / Concentration	Flow	Flow	
Calibration check:				

Notes/Additional Information:



Hydrometrics, Inc.®

2727 Airport Road • Helena, Montana 59601 • (406) 443-4150

CHAIN OF CUSTODY RECORD

PROJ. NO. 1273		PROJECT NAME City of Helena		NO. OF CONTAINERS	ANALYSIS PARAMETERS												REMARKS
SAMPLERS (Signature) R-12					Commons UF/H ₂ O	Nutrients UF/H ₂ O	Diss. Metals UF/H ₂ O	OT UF/H ₂ O	Total Metals UF/H ₂ O	Total Recoverable Metals UF/H ₂ O	BTEX	TPH	PAHs	Other			
DATE	TIME	COMP	GRAB	SAMPLE NUMBER													
12/16/08	1110		X	HL-0812-100	2									X			
↓	1230		X	101	6	X	X	X	X					X			
12/16/08	0930			102													
	1000			103													
	1045			104													
	1245			105													
	1330			106													
	1400			107													
	1430			108													
↓	1510		X	109													

Relinquished (Signature) R-12	Date/Time 12/16/08	Received by: (Signature) R-12	Lab Energy Lab	P.O. # HLN	Shipped via: Bus, Fed Ex, UPS Other Air Bill #
Relinquished (Signature)	Date/Time	Received by: (Signature)	Remarks * 8260 Long List - 0.001mg/L Detection Limit Temp 3.8		
Relinquished (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Enclosed: ☒ Parameter sheet w/detection limits ☐ QA/QC standard mixing instructions ☐ Cover letter ☐ Other	

Hydrometrics, Inc.

Hydrometrics, Inc.

APPENDIX 4

ENERGY LABORATORIES ANALYTICAL REPORT



ANALYTICAL SUMMARY REPORT

January 06, 2009

Richard Lane

Hydrometrics Inc-Helena

3020 Bozeman Ave

Helena, MT 59601

Workorder No.: H08120134

Project Name: 1273 City of Helena

Energy Laboratories Inc received the following 11 samples for Hydrometrics Inc-Helena on 12/12/2008 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H08120134-001	HL-0812-100	12/10/08 11:10	12/12/08	Aqueous	8260-Volatile Organic Comp, 40 CFR Part 258 App I
H08120134-002	HL-0812-101	12/10/08 12:30	12/12/08	Aqueous	Metals by ICP/ICPMS, Dissolved Cyanide, Total Manual Distillation Total Cyanide Digestion Chemical Oxygen Demand Conductivity Anions by Ion Chromatography Nitrogen, Nitrate + Nitrite pH 8260-Volatile Organic Comp, 40 CFR Part 258 App I
H08120134-003	HL-0812-102	12/11/08 9:30	12/12/08	Aqueous	Same As Above
H08120134-004	HL-0812-103	12/11/08 10:00	12/12/08	Aqueous	Same As Above
H08120134-005	HL-0812-104	12/11/08 10:45	12/12/08	Aqueous	Same As Above
H08120134-006	HL-0812-105	12/11/08 12:45	12/12/08	Aqueous	Same As Above
H08120134-007	HL-0812-106	12/11/08 13:30	12/12/08	Aqueous	Same As Above
H08120134-008	HL-0812-107	12/11/08 14:00	12/12/08	Aqueous	Same As Above
H08120134-009	HL-0812-108	12/11/08 14:30	12/12/08	Aqueous	Same As Above
H08120134-010	HL-0812-109	12/11/08 15:10	12/12/08	Aqueous	Same As Above
H08120134-011	Trip Blank TB111308(mc)(b)shp0237	12/11/08 15:10	12/12/08	Trip Blank	8260-Volatile Organic Comp, 40 CFR Part 258 App I

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT, EPA # MT00005
eli-c - Energy Laboratories, Inc. - Casper, WY, EPA# WY00002
eli-g - Energy Laboratories, Inc. - Gillette, WY, EPA# WY00006
eli-h - Energy Laboratories, Inc. - Helena, MT, EPA# MT00945
eli-r - Energy Laboratories, Inc. - Rapid City, SD, EPA# SD00012
eli-t - Energy Laboratories, Inc. - College Station, TX, EPA# TX01520

JAN 12 2009

SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES, INC. will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories are indicated within the Laboratory Analytical Report.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

ELI appreciates the opportunity to provide you with this analytical service. For additional information, including

ANALYTICAL SUMMARY REPORT

certifications, and analytical services visit our web page www.energylab.com.

Report Approved By: _____



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
Toll Free 877.472.0711 * 406.442.0711 * FAX 406.442.0712 * helena@energylab.com

LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-001
Client Sample ID: HL-0812-100

Report Date: 01/06/09
Collection Date: 12/10/08 11:10
Date Received: 12/12/08
Matrix: Aqueous

*Site # 5
Calvin*

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 14:09 / jdh
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 14:09 / jdh
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Chloroform	2.0	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Dichlorodifluoromethane	0.57	ug/L	J	1.0		SW8260B	12/21/08 14:09 / jdh
1,1-Dichloroethane	0.75	ug/L	J	1.0		SW8260B	12/21/08 14:09 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
cis-1,2-Dichloroethene	0.30	ug/L	J	1.0		SW8260B	12/21/08 14:09 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 14:09 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 14:09 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 14:09 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Tetrachloroethene	2.9	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
1,1,1-Trichloroethane	0.41	ug/L	J	1.0		SW8260B	12/21/08 14:09 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Trichloroethene	0.46	ug/L	J	1.0		SW8260B	12/21/08 14:09 / jdh

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

J - Estimated value. The analyte was present but less than the reporting limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-001
Client Sample ID: HL-0812-100

Srta #5
Calvin

Report Date: 01/06/09
Collection Date: 12/10/08 11:10
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	0.61	ug/L	J	1.0		SW8260B	12/21/08 14:09 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 14:09 / jdh
Surr: 1,2-Dichloroethane-d4	97.0	%REC		70-130		SW8260B	12/21/08 14:09 / jdh
Surr: Dibromofluoromethane	86.0	%REC		70-130		SW8260B	12/21/08 14:09 / jdh
Surr: p-Bromofluorobenzene	98.0	%REC		70-130		SW8260B	12/21/08 14:09 / jdh
Surr: Toluene-d8	102	%REC		70-130		SW8260B	12/21/08 14:09 / jdh

**Report
Definitions:**

RL - Analyte reporting limit.
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MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-002
Client Sample ID: HL-0812-101

Report Date: 01/06/09
Collection Date: 12/10/08 12:30
Date Received: 12/12/08
Matrix: Aqueous

HL-94-1

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.4	s.u.		0.1		A4500-H B	12/12/08 13:34 / kjw
Conductivity	975	umhos/cm		1		A2510 B	12/12/08 15:57 / kjw
INORGANICS							
Cyanide, Total	ND	mg/L		0.005		Kelada mod	12/17/08 16:53 / eli-b
Chloride	22	mg/L		1		E300.0	12/18/08 09:35 / hm
Sulfate	89	mg/L		1		E300.0	12/18/08 09:35 / hm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	6	mg/L		1		E410.4	12/15/08 19:00 / stp
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	3.74	mg/L		0.05		E353.2	12/15/08 18:04 / stp
METALS, DISSOLVED							
Antimony	ND	mg/L		0.005		E200.8	12/18/08 03:08 / eli-b
Arsenic	ND	mg/L		0.005		E200.8	12/18/08 03:08 / eli-b
Barium	ND	mg/L		0.1		E200.7	12/17/08 14:09 / eli-b
Beryllium	ND	mg/L		0.001		E200.7	12/17/08 14:09 / eli-b
Cadmium	ND	mg/L		0.001		E200.8	12/18/08 03:08 / eli-b
Chromium	ND	mg/L		0.01		E200.7	12/17/08 14:09 / eli-b
Cobalt	ND	mg/L		0.01		E200.7	12/17/08 14:09 / eli-b
Copper	ND	mg/L		0.01		E200.8	12/18/08 03:08 / eli-b
Iron	ND	mg/L		0.03		E200.7	12/17/08 14:09 / eli-b
Lead	ND	mg/L		0.01		E200.8	12/18/08 03:08 / eli-b
Mercury	ND	mg/L		0.001		E200.8	12/18/08 03:08 / eli-b
Nickel	ND	mg/L		0.01		E200.7	12/17/08 14:09 / eli-b
Selenium	ND	mg/L		0.005		E200.8	12/18/08 03:08 / eli-b
Silver	ND	mg/L		0.005		E200.8	12/18/08 03:08 / eli-b
Thallium	ND	mg/L		0.005		E200.8	12/18/08 03:08 / eli-b
Vanadium	ND	mg/L		0.1		E200.7	12/17/08 14:09 / eli-b
Zinc	ND	mg/L		0.01		E200.7	12/17/08 14:09 / eli-b
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 14:39 / jdj
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 14:39 / jdj
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdj
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdj
Bromodichloromethane	0.69	ug/L	J	1.0		SW8260B	12/21/08 14:39 / jdj
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdj
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdj
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdj

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

J - Estimated value. The analyte was present but less than the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-002
Client Sample ID: HL-0812-101

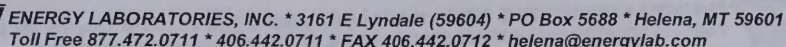
HL-84-1

Report Date: 01/06/09
Collection Date: 12/10/08 12:30
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Chloroform	5.2	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 14:39 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 14:39 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 14:39 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Tetrachloroethene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Trichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 14:39 / jdh
Surr: 1,2-Dichloroethane-d4	114	%REC		70-130		SW8260B	12/21/08 14:39 / jdh

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-002
Client Sample ID: HL-0812-101

Report Date: 01/06/09
Collection Date: 12/10/08 12:30
DateReceived: 12/12/08
Matrix: Aqueous

Report	RL - Analyte reporting limit.	MCL - Maximum contaminant level.
Definitions:	QCL - Quality control limit.	ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-003
Client Sample ID: HL-0812-102

Report Date: 01/06/09
Collection Date: 12/11/08 09:30
Date Received: 12/12/08
Matrix: Aqueous

HL-90-1

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.4	s.u.		0.1		A4500-H B	12/12/08 13:35 / kjw
Conductivity	1070	umhos/cm		1		A2510 B	12/12/08 15:58 / kjw
INORGANICS							
Cyanide, Total	ND	mg/L		0.005		Kelada mod	12/17/08 16:55 / eli-b
Chloride	65	mg/L		1		E300.0	12/18/08 10:33 / hm
Sulfate	140	mg/L		1		E300.0	12/18/08 10:33 / hm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	2	mg/L		1		E410.4	12/15/08 19:00 / stp
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	8.25	mg/L		0.05		E353.2	12/15/08 18:06 / stp
METALS, DISSOLVED							
Antimony	ND	mg/L		0.005		E200.8	12/18/08 03:15 / eli-b
Arsenic	ND	mg/L		0.005		E200.8	12/18/08 03:15 / eli-b
Barium	ND	mg/L		0.1		E200.7	12/17/08 14:22 / eli-b
Beryllium	ND	mg/L		0.001		E200.7	12/17/08 14:22 / eli-b
Cadmium	ND	mg/L		0.001		E200.8	12/18/08 03:15 / eli-b
Chromium	ND	mg/L		0.01		E200.7	12/17/08 14:22 / eli-b
Cobalt	ND	mg/L		0.01		E200.7	12/17/08 14:22 / eli-b
Copper	ND	mg/L		0.01		E200.8	12/18/08 03:15 / eli-b
Iron	ND	mg/L		0.03		E200.7	12/17/08 14:22 / eli-b
Lead	ND	mg/L		0.01		E200.8	12/18/08 03:15 / eli-b
Mercury	ND	mg/L		0.001		E200.8	12/18/08 03:15 / eli-b
Nickel	ND	mg/L		0.01		E200.8	12/18/08 03:15 / eli-b
Selenium	ND	mg/L		0.005		E200.8	12/18/08 03:15 / eli-b
Silver	ND	mg/L		0.005		E200.8	12/18/08 03:15 / eli-b
Thallium	ND	mg/L		0.005		E200.8	12/18/08 03:15 / eli-b
Vanadium	ND	mg/L		0.1		E200.7	12/17/08 14:22 / eli-b
Zinc	ND	mg/L		0.01		E200.7	12/17/08 14:22 / eli-b
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 15:09 / jdjh
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 15:09 / jdjh
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdjh
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdjh
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdjh
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdjh
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdjh
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdjh

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-003
Client Sample ID: HL-0812-102

Report Date: 01/06/09
Collection Date: 12/11/08 09:30
Date Received: 12/12/08
Matrix: Aqueous

HL-80-1

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Chloroform	1.1	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Dichlorodifluoromethane	0.31	ug/L	J	1.0		SW8260B	12/21/08 15:09 / jdh
1,1-Dichloroethane	1.9	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
cis-1,2-Dichloroethene	1.1	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 15:09 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 15:09 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 15:09 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Tetrachloroethene	5.4	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,1,1-Trichloroethane	0.34	ug/L	J	1.0		SW8260B	12/21/08 15:09 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Trichloroethene	1.2	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 15:09 / jdh
Surr: 1,2-Dichloroethane-d4	98.0	%REC		70-130		SW8260B	12/21/08 15:09 / jdh

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

J - Estimated value. The analyte was present but less than the reporting limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
Toll Free 877.472.0711 * 406.442.0711 * FAX 406.442.0712 * helena@energylab.com

LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-003
Client Sample ID: HL-0812-102

HL-80-1

Report Date: 01/06/09
Collection Date: 12/11/08 09:30
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Surr: Dibromofluoromethane	84.0	%REC		70-130		SW8260B	12/21/08 15:09 / jdh
Surr: p-Bromofluorobenzene	97.0	%REC		70-130		SW8260B	12/21/08 15:09 / jdh
Surr: Toluene-d8	104	%REC		70-130		SW8260B	12/21/08 15:09 / jdh

Report
Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-004
Client Sample ID: HL-0812-103

Report Date: 01/06/09
Collection Date: 12/11/08 10:00
Date Received: 12/12/08
Matrix: Aqueous

HL-80-1
Duplicate

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.4	s.u.		0.1		A4500-H B	12/12/08 13:37 / kjw
Conductivity	1080	umhos/cm		1		A2510 B	12/12/08 15:59 / kjw
INORGANICS							
Cyanide, Total	ND	mg/L		0.005		Kelada mod	12/17/08 16:57 / eli-b
Chloride	66	mg/L		1		E300.0	12/18/08 10:53 / hm
Sulfate	140	mg/L		1		E300.0	12/18/08 10:53 / hm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	1	mg/L		1		E410.4	12/15/08 19:00 / stp
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	8.30	mg/L		0.05		E353.2	12/15/08 18:08 / stp
METALS, DISSOLVED							
Antimony	ND	mg/L		0.005		E200.8	12/18/08 03:23 / eli-b
Arsenic	ND	mg/L		0.005		E200.8	12/18/08 03:23 / eli-b
Barium	ND	mg/L		0.1		E200.7	12/17/08 14:26 / eli-b
Beryllium	ND	mg/L		0.001		E200.7	12/17/08 14:26 / eli-b
Cadmium	ND	mg/L		0.001		E200.8	12/18/08 03:23 / eli-b
Chromium	ND	mg/L		0.01		E200.7	12/17/08 14:26 / eli-b
Cobalt	ND	mg/L		0.01		E200.7	12/17/08 14:26 / eli-b
Copper	ND	mg/L		0.01		E200.8	12/18/08 03:23 / eli-b
Iron	ND	mg/L		0.03		E200.7	12/17/08 14:26 / eli-b
Lead	ND	mg/L		0.01		E200.8	12/18/08 03:23 / eli-b
Mercury	ND	mg/L		0.001		E200.8	12/18/08 03:23 / eli-b
Nickel	ND	mg/L		0.01		E200.8	12/18/08 03:23 / eli-b
Selenium	ND	mg/L		0.005		E200.8	12/18/08 03:23 / eli-b
Silver	ND	mg/L		0.005		E200.8	12/18/08 03:23 / eli-b
Thallium	ND	mg/L		0.005		E200.8	12/18/08 03:23 / eli-b
Vanadium	ND	mg/L		0.1		E200.7	12/17/08 14:26 / eli-b
Zinc	ND	mg/L		0.01		E200.8	12/18/08 03:23 / eli-b
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 15:38 / jdh
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 15:38 / jdh
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-004
Client Sample ID: HL-0812-103

Report Date: 01/06/09
Collection Date: 12/11/08 10:00
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Chloroform	1.1	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Dichlorodifluoromethane	0.32	ug/L	J	1.0		SW8260B	12/21/08 15:38 / jdh
1,1-Dichloroethane	1.9	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
cis-1,2-Dichloroethene	1.0	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 15:38 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 15:38 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 15:38 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Tetrachloroethene	5.9	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,1,1-Trichloroethane	0.33	ug/L	J	1.0		SW8260B	12/21/08 15:38 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Trichloroethene	1.2	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 15:38 / jdh
Surr: 1,2-Dichloroethane-d4	98.0	%REC		70-130		SW8260B	12/21/08 15:38 / jdh

Report RL - Analyte reporting limit.

MCL - Maximum contaminant level.

Definitions: QCL - Quality control limit.

ND - Not detected at the reporting limit.

J - Estimated value. The analyte was present but less than the reporting limit.



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
Toll Free 877.472.0711 * 406.442.0711 * FAX 406.442.0712 * helena@energylab.com

LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-004
Client Sample ID: HL-0812-103

Report Date: 01/06/09
Collection Date: 12/11/08 10:00
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Surr: Dibromofluoromethane	97.0	%REC		70-130		SW8260B	12/21/08 15:38 / jdh
Surr: p-Bromofluorobenzene	91.0	%REC		70-130		SW8260B	12/21/08 15:38 / jdh
Surr: Toluene-d8	103	%REC		70-130		SW8260B	12/21/08 15:38 / jdh

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-005
Client Sample ID: HL-0812-104

Report Date: 01/06/09
Collection Date: 12/11/08 10:45
Date Received: 12/12/08
Matrix: Aqueous

MPC-5

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.0	s.u.		0.1		A4500-H B	12/12/08 13:38 / kjw
Conductivity	2880	umhos/cm		1		A2510 B	12/12/08 16:00 / kjw
INORGANICS							
Cyanide, Total	5.0	mg/L	D	0.1		Kelada mod	12/24/08 10:23 / eli-b
Chloride	24	mg/L		1		E300.0	12/18/08 11:12 / hm
Sulfate	820	mg/L		1		E300.0	12/18/08 11:12 / hm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	35	mg/L		1		E410.4	12/15/08 19:00 / stp
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	17.3	mg/L	D	0.1		E353.2	12/15/08 18:10 / stp
METALS, DISSOLVED							
Antimony	ND	mg/L		0.005		E200.8	12/18/08 03:31 / eli-b
Arsenic	0.006	mg/L		0.005		E200.8	12/18/08 03:31 / eli-b
Barium	ND	mg/L		0.1		E200.7	12/17/08 14:30 / eli-b
Beryllium	ND	mg/L		0.001		E200.7	12/17/08 14:30 / eli-b
Cadmium	ND	mg/L		0.001		E200.8	12/18/08 03:31 / eli-b
Chromium	ND	mg/L		0.01		E200.8	12/18/08 03:31 / eli-b
Cobalt	ND	mg/L		0.01		E200.8	12/18/08 03:31 / eli-b
Copper	0.02	mg/L		0.01		E200.8	12/18/08 03:31 / eli-b
Iron	1.69	mg/L		0.03		E200.7	12/17/08 14:30 / eli-b
Lead	ND	mg/L		0.01		E200.8	12/18/08 03:31 / eli-b
Mercury	ND	mg/L		0.001		E200.8	12/18/08 03:31 / eli-b
Nickel	0.02	mg/L		0.01		E200.8	12/18/08 03:31 / eli-b
Selenium	0.007	mg/L		0.005		E200.8	12/18/08 03:31 / eli-b
Silver	ND	mg/L		0.005		E200.8	12/18/08 03:31 / eli-b
Thallium	ND	mg/L		0.005		E200.8	12/18/08 03:31 / eli-b
Vanadium	ND	mg/L		0.1		E200.7	12/17/08 14:30 / eli-b
Zinc	ND	mg/L		0.01		E200.7	12/17/08 14:30 / eli-b
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 16:08 / jdH
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 16:08 / jdH
Benzene	1.3	ug/L		1.0		SW8260B	12/21/08 16:08 / jdH
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdH
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdH
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdH
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdH
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdH

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-005
Client Sample ID: HL-0812-104

Report Date: 01/06/09
Collection Date: 12/11/08 10:45
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Chloroform	0.38	ug/L	J	1.0		SW8260B	12/21/08 16:08 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 16:08 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 16:08 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 16:08 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Styrene	0.46	ug/L	J	1.0		SW8260B	12/21/08 16:08 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Tetrachloroethene	0.42	ug/L	J	1.0		SW8260B	12/21/08 16:08 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Trichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
m+p-Xylenes	0.65	ug/L	J	1.0		SW8260B	12/21/08 16:08 / jdh
o-Xylene	0.58	ug/L	J	1.0		SW8260B	12/21/08 16:08 / jdh
Xylenes, Total	1.2	ug/L		1.0		SW8260B	12/21/08 16:08 / jdh
Surr: 1,2-Dichloroethane-d4	101	%REC		70-130		SW8260B	12/21/08 16:08 / jdh

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

J - Estimated value. The analyte was present but less than the reporting limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-005
Client Sample ID: HL-0812-104

Report Date: 01/06/09
Collection Date: 12/11/08 10:45
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
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VOLATILE ORGANIC COMPOUNDS

Surr: Dibromofluoromethane	85.0	%REC		70-130		SW8260B	12/21/08 16:08 / jdh
Surr: p-Bromofluorobenzene	95.0	%REC		70-130		SW8260B	12/21/08 16:08 / jdh
Surr: Toluene-d8	105	%REC		70-130		SW8260B	12/21/08 16:08 / jdh

Report

Definitions:

RL - Analyte reporting limit.

QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-006
Client Sample ID: HL-0812-105

Report Date: 01/06/09
Collection Date: 12/11/08 12:45
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	6.9	s.u.		0.1		A4500-H B	12/12/08 13:39 / kjw
Conductivity	1160	umhos/cm		1		A2510 B	12/12/08 16:01 / kjw
INORGANICS							
Cyanide, Total	ND	mg/L		0.005		Kelada mod	12/17/08 18:05 / eli-b
Chloride	28	mg/L		1		E300.0	12/18/08 11:32 / hm
Sulfate	69	mg/L		1		E300.0	12/18/08 11:32 / hm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	ND	mg/L		1		E410.4	12/15/08 19:00 / stp
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	1.20	mg/L		0.05		E353.2	12/15/08 18:12 / stp
METALS, DISSOLVED							
Antimony	ND	mg/L		0.005		E200.8	12/18/08 03:38 / eli-b
Arsenic	ND	mg/L		0.005		E200.8	12/18/08 03:38 / eli-b
Barium	ND	mg/L		0.1		E200.7	12/17/08 14:34 / eli-b
Beryllium	ND	mg/L		0.001		E200.7	12/17/08 14:34 / eli-b
Cadmium	ND	mg/L		0.001		E200.8	12/18/08 03:38 / eli-b
Chromium	ND	mg/L		0.01		E200.8	12/18/08 03:38 / eli-b
Cobalt	ND	mg/L		0.01		E200.8	12/18/08 03:38 / eli-b
Copper	ND	mg/L		0.01		E200.8	12/18/08 03:38 / eli-b
Iron	ND	mg/L		0.03		E200.7	12/17/08 14:34 / eli-b
Lead	ND	mg/L		0.01		E200.8	12/18/08 03:38 / eli-b
Mercury	ND	mg/L		0.001		E200.8	12/18/08 03:38 / eli-b
Nickel	ND	mg/L		0.01		E200.8	12/18/08 03:38 / eli-b
Selenium	ND	mg/L		0.005		E200.8	12/18/08 03:38 / eli-b
Silver	ND	mg/L		0.005		E200.8	12/18/08 03:38 / eli-b
Thallium	ND	mg/L		0.005		E200.8	12/18/08 03:38 / eli-b
Vanadium	ND	mg/L		0.1		E200.7	12/17/08 14:34 / eli-b
Zinc	ND	mg/L		0.01		E200.7	12/17/08 14:34 / eli-b
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 16:38 / jdh
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 16:38 / jdh
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-006
Client Sample ID: HL-0812-105

Report Date: 01/06/09
Collection Date: 12/11/08 12:45
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Chloroform	0.22	ug/L	J	1.0		SW8260B	12/21/08 16:38 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 16:38 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 16:38 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 16:38 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Tetrachloroethene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,1,1-Trichloroethane	5.0	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Trichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 16:38 / jdh
Surr: 1,2-Dichloroethane-d4	105	%REC		70-130		SW8260B	12/21/08 16:38 / jdh

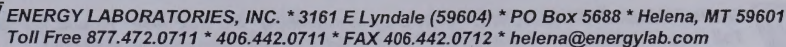
Report RL - Analyte reporting limit.

MCL - Maximum contaminant level.

Definitions: QCL - Quality control limit.

ND - Not detected at the reporting limit.

J - Estimated value. The analyte was present but less than the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-006
Client Sample ID: HL-0812-105

Report Date: 01/06/09
Collection Date: 12/11/08 12:45
DateReceived: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Surr: Dibromofluoromethane	89.0	%REC		70-130		SW8260B	12/21/08 16:38 / jdh
Surr: p-Bromofluorobenzene	96.0	%REC		70-130		SW8260B	12/21/08 16:38 / jdh
Surr: Toluene-d8	103	%REC		70-130		SW8260B	12/21/08 16:38 / jdh

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-007
Client Sample ID: HL-0812-106

HL-99-3

Report Date: 01/06/09
Collection Date: 12/11/08 13:30
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.3	s.u.		0.1		A4500-H B	12/12/08 13:41 / kjw
Conductivity	902	umhos/cm		1		A2510 B	12/12/08 16:03 / kjw
INORGANICS							
Cyanide, Total	0.031	mg/L		0.005		Kelada mod	12/26/08 14:29 / eli-b
Chloride	49	mg/L		1		E300.0	12/18/08 11:51 / hm
Sulfate	150	mg/L		1		E300.0	12/18/08 11:51 / hm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	ND	mg/L		1		E410.4	12/15/08 19:00 / stp
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	8.22	mg/L		0.05		E353.2	12/15/08 18:18 / stp
METALS, DISSOLVED							
Antimony	ND	mg/L		0.005		E200.8	12/18/08 03:46 / eli-b
Arsenic	ND	mg/L		0.005		E200.8	12/18/08 03:46 / eli-b
Barium	ND	mg/L		0.1		E200.7	12/17/08 14:38 / eli-b
Beryllium	ND	mg/L		0.001		E200.7	12/17/08 14:38 / eli-b
Cadmium	ND	mg/L		0.001		E200.8	12/18/08 03:46 / eli-b
Chromium	ND	mg/L		0.01		E200.7	12/17/08 14:38 / eli-b
Cobalt	ND	mg/L		0.01		E200.8	12/18/08 03:46 / eli-b
Copper	ND	mg/L		0.01		E200.8	12/18/08 03:46 / eli-b
Iron	0.26	mg/L		0.03		E200.7	12/17/08 14:38 / eli-b
Lead	ND	mg/L		0.01		E200.8	12/18/08 03:46 / eli-b
Mercury	ND	mg/L		0.001		E200.8	12/18/08 03:46 / eli-b
Nickel	ND	mg/L		0.01		E200.7	12/17/08 14:38 / eli-b
Selenium	ND	mg/L		0.005		E200.8	12/18/08 03:46 / eli-b
Silver	ND	mg/L		0.005		E200.8	12/18/08 03:46 / eli-b
Thallium	ND	mg/L		0.005		E200.8	12/18/08 03:46 / eli-b
Vanadium	ND	mg/L		0.1		E200.7	12/17/08 14:38 / eli-b
Zinc	ND	mg/L		0.01		E200.7	12/17/08 14:38 / eli-b
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 17:08 / jdh
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 17:08 / jdh
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh

Report: RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-007
Client Sample ID: HL-0812-106

Report Date: 01/06/09
Collection Date: 12/11/08 13:30
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Chloroform	2.1	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Dichlorodifluoromethane	1.2	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,1-Dichloroethane	2.0	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
cis-1,2-Dichloroethene	0.56	ug/L	J	1.0		SW8260B	12/21/08 17:08 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 17:08 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 17:08 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 17:08 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Tetrachloroethene	5.3	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
1,1,1-Trichloroethane	0.27	ug/L	J	1.0		SW8260B	12/21/08 17:08 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Trichloroethene	0.89	ug/L	J	1.0		SW8260B	12/21/08 17:08 / jdh
Trichlorofluoromethane	0.43	ug/L	J	1.0		SW8260B	12/21/08 17:08 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 17:08 / jdh
Surr: 1,2-Dichloroethane-d4	101	%REC		70-130		SW8260B	12/21/08 17:08 / jdh

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

J - Estimated value. The analyte was present but less than the reporting limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-007
Client Sample ID: HL-0812-106

Report Date: 01/06/09
Collection Date: 12/11/08 13:30
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Surr: Dibromofluoromethane	90.0	%REC		70-130		SW8260B	12/21/08 17:08 / jdh
Surr: p-Bromofluorobenzene	89.0	%REC		70-130		SW8260B	12/21/08 17:08 / jdh
Surr: Toluene-d8	108	%REC		70-130		SW8260B	12/21/08 17:08 / jdh

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-008
Client Sample ID: HL-0812-107

Report Date: 01/06/09
Collection Date: 12/11/08 14:00
Date Received: 12/12/08
Matrix: Aqueous

HL-99-2

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.3	s.u.		0.1		A4500-H B	12/12/08 13:41 / kjw
Conductivity	887	umhos/cm		1		A2510 B	12/12/08 16:04 / kjw
INORGANICS							
Cyanide, Total	ND	mg/L		0.005		Kelada mod	12/17/08 17:12 / eli-b
Chloride	42	mg/L		1		E300.0	12/18/08 12:11 / hm
Sulfate	130	mg/L		1		E300.0	12/18/08 12:11 / hm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	ND	mg/L		1		E410.4	12/15/08 19:00 / stp
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	7.49	mg/L		0.05		E353.2	12/15/08 18:20 / stp
METALS, DISSOLVED							
Antimony	ND	mg/L		0.005		E200.8	12/18/08 03:54 / eli-b
Arsenic	ND	mg/L		0.005		E200.8	12/18/08 03:54 / eli-b
Barium	ND	mg/L		0.1		E200.7	12/17/08 14:50 / eli-b
Beryllium	ND	mg/L		0.001		E200.7	12/17/08 14:50 / eli-b
Cadmium	ND	mg/L		0.001		E200.8	12/18/08 03:54 / eli-b
Chromium	ND	mg/L		0.01		E200.7	12/17/08 14:50 / eli-b
Cobalt	ND	mg/L		0.01		E200.7	12/17/08 14:50 / eli-b
Copper	ND	mg/L		0.01		E200.8	12/18/08 03:54 / eli-b
Iron	ND	mg/L		0.03		E200.7	12/17/08 14:50 / eli-b
Lead	ND	mg/L		0.01		E200.8	12/18/08 03:54 / eli-b
Mercury	ND	mg/L		0.001		E200.8	12/18/08 03:54 / eli-b
Nickel	ND	mg/L		0.01		E200.8	12/18/08 03:54 / eli-b
Selenium	ND	mg/L		0.005		E200.8	12/18/08 03:54 / eli-b
Silver	ND	mg/L		0.005		E200.8	12/18/08 03:54 / eli-b
Thallium	ND	mg/L		0.005		E200.8	12/18/08 03:54 / eli-b
Vanadium	ND	mg/L		0.1		E200.7	12/17/08 14:50 / eli-b
Zinc	ND	mg/L		0.01		E200.7	12/17/08 14:50 / eli-b
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 17:38 / jdH
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 17:38 / jdH
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdH
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdH
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdH
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdH
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdH
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdH

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-008
Client Sample ID: HL-0812-107

Report Date: 01/06/09
Collection Date: 12/11/08 14:00
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Chloroform	2.0	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Dichlorodifluoromethane	2.9	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,1-Dichloroethane	3.0	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
cis-1,2-Dichloroethene	0.64	ug/L	J	1.0		SW8260B	12/21/08 17:38 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 17:38 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 17:38 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 17:38 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Tetrachloroethene	6.4	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Trichloroethene	1.2	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Trichlorofluoromethane	0.83	ug/L	J	1.0		SW8260B	12/21/08 17:38 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 17:38 / jdh
Surr: 1,2-Dichloroethane-d4	103	%REC		70-130		SW8260B	12/21/08 17:38 / jdh

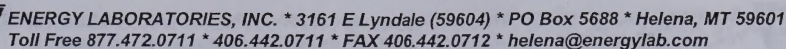
Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

J - Estimated value. The analyte was present but less than the reporting limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



Report Date: 01/06/09
Collection Date: 12/11/08 14:00
DateReceived: 12/12/08
Matrix: Aqueous

Report	RL - Analyte reporting limit.	MCL - Maximum contaminant level.
Definitions:	QCL - Quality control limit.	ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-009
Client Sample ID: HL-0812-108

Report Date: 01/06/09
Collection Date: 12/11/08 14:30
Date Received: 12/12/08
Matrix: Aqueous

HL-88-1

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.2	s.u.		0.1		A4500-H B	12/12/08 13:42 / kjw
Conductivity	1130	umhos/cm		1		A2510 B	12/12/08 16:04 / kjw
INORGANICS							
Cyanide, Total	ND	mg/L		0.005		Kelada mod	12/17/08 17:13 / eli-b
Chloride	64	mg/L		1		E300.0	12/18/08 13:09 / hm
Sulfate	160	mg/L		1		E300.0	12/18/08 13:09 / hm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	2	mg/L		1		E410.4	12/15/08 19:00 / stp
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	8.77	mg/L		0.05		E353.2	12/15/08 18:22 / stp
METALS, DISSOLVED							
Antimony	ND	mg/L		0.005		E200.8	12/18/08 04:32 / eli-b
Arsenic	ND	mg/L		0.005		E200.8	12/18/08 04:32 / eli-b
Barium	ND	mg/L		0.1		E200.7	12/17/08 14:54 / eli-b
Beryllium	ND	mg/L		0.001		E200.7	12/17/08 14:54 / eli-b
Cadmium	ND	mg/L		0.001		E200.8	12/18/08 04:32 / eli-b
Chromium	ND	mg/L		0.01		E200.8	12/18/08 04:32 / eli-b
Cobalt	ND	mg/L		0.01		E200.8	12/18/08 04:32 / eli-b
Copper	ND	mg/L		0.01		E200.8	12/18/08 04:32 / eli-b
Iron	ND	mg/L		0.03		E200.7	12/17/08 14:54 / eli-b
Lead	ND	mg/L		0.01		E200.8	12/18/08 04:32 / eli-b
Mercury	ND	mg/L		0.001		E200.8	12/18/08 04:32 / eli-b
Nickel	ND	mg/L		0.01		E200.7	12/17/08 14:54 / eli-b
Selenium	ND	mg/L		0.005		E200.8	12/18/08 04:32 / eli-b
Silver	ND	mg/L		0.005		E200.8	12/18/08 04:32 / eli-b
Thallium	ND	mg/L		0.005		E200.8	12/18/08 04:32 / eli-b
Vanadium	ND	mg/L		0.1		E200.7	12/17/08 14:54 / eli-b
Zinc	0.02	mg/L		0.01		E200.8	12/18/08 04:32 / eli-b
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 18:07 / jdH
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 18:07 / jdH
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdH
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdH
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdH
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdH
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdH
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdH

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
Toll Free 877.472.0711 * 406.442.0711 * FAX 406.442.0712 * helena@energylab.com

LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-009
Client Sample ID: HL-0812-108

Report Date: 01/06/09
Collection Date: 12/11/08 14:30
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Chloroform	2.5	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Dichlorodifluoromethane	0.88	ug/L	J	1.0		SW8260B	12/21/08 18:07 / jdh
1,1-Dichloroethane	0.89	ug/L	J	1.0		SW8260B	12/21/08 18:07 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
cis-1,2-Dichloroethene	1.8	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 18:07 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 18:07 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 18:07 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Tetrachloroethene	3.7	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Trichloroethene	0.77	ug/L	J	1.0		SW8260B	12/21/08 18:07 / jdh
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 18:07 / jdh
Surr: 1,2-Dichloroethane-d4	99.0	%REC		70-130		SW8260B	12/21/08 18:07 / jdh

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

J - Estimated value. The analyte was present but less than the reporting limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-009
Client Sample ID: HL-0812-108

Report Date: 01/06/09
Collection Date: 12/11/08 14:30
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Surr: Dibromofluoromethane	95.0	%REC		70-130		SW8260B	12/21/08 18:07 / jdh
Surr: p-Bromofluorobenzene	94.0	%REC		70-130		SW8260B	12/21/08 18:07 / jdh
Surr: Toluene-d8	99.0	%REC		70-130		SW8260B	12/21/08 18:07 / jdh

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LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-010
Client Sample ID: HL-0812-109

Report Date: 01/06/09
Collection Date: 12/11/08 15:10
Date Received: 12/12/08
Matrix: Aqueous

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Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	5.7	s.u.		0.1		A4500-H B	12/12/08 13:49 / kjw
Conductivity	2	umhos/cm		1		A2510 B	12/12/08 16:05 / kjw
INORGANICS							
Cyanide, Total	ND	mg/L		0.005		Kelada mod	12/17/08 17:21 / eli-b
Chloride	ND	mg/L		1		E300.0	12/18/08 13:28 / hm
Sulfate	ND	mg/L		1		E300.0	12/18/08 13:28 / hm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	ND	mg/L		1		E410.4	12/15/08 19:00 / stp
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.06	mg/L		0.05		E353.2	12/15/08 18:24 / stp
METALS, DISSOLVED							
Antimony	ND	mg/L		0.005		E200.8	12/18/08 04:40 / eli-b
Arsenic	ND	mg/L		0.005		E200.8	12/18/08 04:40 / eli-b
Barium	ND	mg/L		0.1		E200.7	12/17/08 14:58 / eli-b
Beryllium	ND	mg/L		0.001		E200.7	12/17/08 14:58 / eli-b
Cadmium	ND	mg/L		0.001		E200.8	12/18/08 04:40 / eli-b
Chromium	ND	mg/L		0.01		E200.8	12/18/08 04:40 / eli-b
Cobalt	ND	mg/L		0.01		E200.8	12/18/08 04:40 / eli-b
Copper	ND	mg/L		0.01		E200.8	12/18/08 04:40 / eli-b
Iron	ND	mg/L		0.03		E200.7	12/17/08 14:58 / eli-b
Lead	ND	mg/L		0.01		E200.8	12/18/08 04:40 / eli-b
Mercury	ND	mg/L		0.001		E200.8	12/18/08 04:40 / eli-b
Nickel	ND	mg/L		0.01		E200.8	12/18/08 04:40 / eli-b
Selenium	ND	mg/L		0.005		E200.8	12/18/08 04:40 / eli-b
Silver	ND	mg/L		0.005		E200.8	12/18/08 04:40 / eli-b
Thallium	ND	mg/L		0.005		E200.8	12/18/08 04:40 / eli-b
Vanadium	ND	mg/L		0.1		E200.7	12/17/08 14:58 / eli-b
Zinc	ND	mg/L		0.01		E200.7	12/17/08 14:58 / eli-b
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 18:37 / jd
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 18:37 / jd
Benzene	0.14	ug/L	J	1.0		SW8260B	12/21/08 18:37 / jd
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jd
Bromodichloromethane	4.2	ug/L		1.0		SW8260B	12/21/08 18:37 / jd
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jd
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jd
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jd

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

J - Estimated value. The analyte was present but less than the reporting limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-010
Client Sample ID: HL-0812-109

Report Date: 01/06/09
Collection Date: 12/11/08 15:10
Date Received: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Chlorodibromomethane	0.57	ug/L	J	1.0		SW8260B	12/21/08 18:37 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Chloroform	19	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 18:37 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 18:37 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 18:37 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Tetrachloroethene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Toluene	0.50	ug/L	J	1.0		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Trichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
m+p-Xylenes	0.26	ug/L	J	1.0		SW8260B	12/21/08 18:37 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 18:37 / jdh
Xylenes, Total	0.26	ug/L	J	1.0		SW8260B	12/21/08 18:37 / jdh
Surr: 1,2-Dichloroethane-d4	107	%REC		70-130		SW8260B	12/21/08 18:37 / jdh

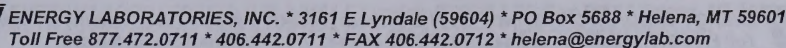
Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

J - Estimated value. The analyte was present but less than the reporting limit.

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LABORATORY ANALYTICAL REPORT

Report Date: 01/06/09
Collection Date: 12/11/08 15:10
DateReceived: 12/12/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Surr: Dibromofluoromethane	89.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
Surr: p-Bromofluorobenzene	92.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
Surr: Toluene-d8	105	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,2-Dichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethene	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,1-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1,2-Trichloroethane	0.0	%REC		70-130		SW8260B	12/21/08 18:37 / jdh
1,1-Dichloroethane	0.0	%REC		70-130		SW8260B	12/21/08

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-011
Client Sample ID: Trip Blank TB111308(mc)(b)shp0237

Report Date: 01/06/09
Collection Date: 12/11/08 15:10
Date Received: 12/12/08
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 13:10 / jdh
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 13:10 / jdh
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Chloroform	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 13:10 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 13:10 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 13:10 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Tetrachloroethene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Trichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120134-011
Client Sample ID: Trip Blank TB111308(mc)(b)shp0237

Report Date: 01/06/09
Collection Date: 12/11/08 15:10
Date Received: 12/12/08
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 13:10 / jdh
Surr: 1,2-Dichloroethane-d4	103	%REC		70-130		SW8260B	12/21/08 13:10 / jdh
Surr: Dibromofluoromethane	86.0	%REC		70-130		SW8260B	12/21/08 13:10 / jdh
Surr: p-Bromofluorobenzene	93.0	%REC		70-130		SW8260B	12/21/08 13:10 / jdh
Surr: Toluene-d8	110	%REC		70-130		SW8260B	12/21/08 13:10 / jdh

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B								Analytical Run: COND_081212A		
Sample ID: CCV1_081212A	Continuing Calibration Verification Standard									12/12/08 16:06
Conductivity		1380	umhos/cm	1.0	97	90	110			
Method: A2510 B								Batch: 081212A-COND-PROBE-W		
Sample ID: LCS1_081212A	Laboratory Control Sample									12/12/08 15:45
Conductivity		1390	umhos/cm	1.0	98	90	110			
Sample ID: H08120134-006BDUP	Sample Duplicate									12/12/08 16:01
Conductivity		1170	umhos/cm	1.0				0.4	10	
Method: A4500-H B								Analytical Run: PH_081212A		
Sample ID: CCV1_081212A	Continuing Calibration Verification Standard									12/12/08 13:36
pH		9.99	s.u.	0.10	100	99	101			
Method: A4500-H B								Batch: 081212A-PH-W		
Sample ID: LCS1_081212A	Laboratory Control Sample									12/12/08 13:25
pH		7.02	s.u.	0.10	100	99	101			
Sample ID: H08120134-006BDUP	Sample Duplicate									12/12/08 13:39
pH		6.92	s.u.	0.10				0.1	2	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7		Analytical Run: SUB-B122295								
Sample ID: QCS	8	Initial Calibration Verification Standard							12/17/08 11:52	
Barium		0.836	mg/L	0.10	104	90	110			
Beryllium		0.404	mg/L	0.010	101	90	110			
Chromium		0.844	mg/L	0.050	105	90	110			
Cobalt		0.830	mg/L	0.020	104	90	110			
Iron		4.11	mg/L	0.030	103	90	110			
Nickel		0.829	mg/L	0.050	104	90	110			
Vanadium		0.815	mg/L	0.10	102	90	110			
Zinc		0.841	mg/L	0.010	105	90	110			
Sample ID: ICSA	8	Interference Check Sample A							12/17/08 12:08	
Barium		0.000830	mg/L	0.10		-0.005	0.0005			
Beryllium		0.000260	mg/L	0.010		-0.001	0.001			
Chromium		-0.00425	mg/L	0.050		-0.01	0.01			
Cobalt		-0.00208	mg/L	0.020		-0.01	0.01			
Iron		199	mg/L	0.030	100	80	120			
Nickel		-0.00209	mg/L	0.050		-0.05	0.05			
Vanadium		0.0340	mg/L	0.10		-0.01	0.01			
Zinc		-0.0320	mg/L	0.010		-0.01	0.01			
Sample ID: ICSAB	8	Interference Check Sample AB							12/17/08 12:12	
Barium		0.563	mg/L	0.10	113	80	120			
Beryllium		0.507	mg/L	0.010	101	80	120			
Chromium		0.546	mg/L	0.050	109	80	120			
Cobalt		0.576	mg/L	0.020	115	80	120			
Iron		200	mg/L	0.030	100	80	120			
Nickel		1.14	mg/L	0.050	114	80	120			
Vanadium		0.567	mg/L	0.10	113	80	120			
Zinc		1.06	mg/L	0.010	106	80	120			
Sample ID: ICV	8	Continuing Calibration Verification Standard							12/17/08 11:56	
Barium		2.59	mg/L	0.10	103	95	105			
Beryllium		1.25	mg/L	0.010	100	95	105			
Chromium		2.57	mg/L	0.050	103	95	105			
Cobalt		2.54	mg/L	0.020	102	95	105			
Iron		2.53	mg/L	0.030	101	95	105			
Nickel		2.50	mg/L	0.050	100	95	105			
Vanadium		2.53	mg/L	0.10	101	95	105			
Zinc		2.57	mg/L	0.010	103	95	105			
Method: E200.7		Batch: B_R122295								
Sample ID: MB-SPDIS081217A	8	Method Blank				Run: SUB-B122295			12/17/08 12:45	
Barium		0.0003	mg/L	0.0001						
Beryllium		ND	mg/L	8E-05						
Chromium		ND	mg/L	0.002						
Cobalt		0.004	mg/L	0.0010						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Batch: B_R122295
Sample ID: MB-SPDIS081217A	8	Method Blank					Run: SUB-B122295			12/17/08 12:45
Iron		0.004	mg/L	0.002						
Nickel		0.002	mg/L	0.001						
Vanadium		ND	mg/L	0.001						
Zinc		0.003	mg/L	0.0004						
Sample ID: LFB-SPDIS081217A	8	Laboratory Fortified Blank					Run: SUB-B122295			12/17/08 12:49
Barium		1.01	mg/L	0.10	101	85	115			
Beryllium		0.500	mg/L	0.010	100	85	115			
Chromium		1.04	mg/L	0.050	104	85	115			
Cobalt		1.03	mg/L	0.020	102	85	115			
Iron		5.09	mg/L	0.030	102	85	115			
Nickel		1.02	mg/L	0.050	102	85	115			
Vanadium		1.02	mg/L	0.10	102	85	115			
Zinc		1.04	mg/L	0.010	104	85	115			
Sample ID: H08120134-007C	8	Sample Matrix Spike					Run: SUB-B122295			12/17/08 14:42
Barium		2.04	mg/L	0.10	100	70	130			
Beryllium		0.987	mg/L	0.0010	99	70	130			
Chromium		2.19	mg/L	0.010	109	70	130			
Cobalt		2.13	mg/L	0.010	106	70	130			
Iron		10.8	mg/L	0.030	106	70	130			
Nickel		2.06	mg/L	0.010	102	70	130			
Vanadium		2.05	mg/L	0.10	102	70	130			
Zinc		2.09	mg/L	0.010	105	70	130			
Sample ID: H08120134-007C	8	Sample Matrix Spike Duplicate					Run: SUB-B122295			12/17/08 14:46
Barium		2.02	mg/L	0.10	99	70	130	0.7	20	
Beryllium		0.987	mg/L	0.0010	99	70	130	0	20	
Chromium		2.11	mg/L	0.010	105	70	130	3.8	20	
Cobalt		2.04	mg/L	0.010	101	70	130	4.5	20	
Iron		10.4	mg/L	0.030	101	70	130	4.1	20	
Nickel		2.02	mg/L	0.010	101	70	130	1.8	20	
Vanadium		1.96	mg/L	0.10	98	70	130	4.3	20	
Zinc		2.01	mg/L	0.010	100	70	130	4	20	
Sample ID: B08121338-003BMS2	8	Sample Matrix Spike					Run: SUB-B122295			12/17/08 13:41
Barium		18.2	mg/L	0.10	91	70	130			
Beryllium		9.01	mg/L	0.0016	90	70	130			
Chromium		19.7	mg/L	0.021	99	70	130			
Cobalt		19.2	mg/L	0.021	94	70	130			
Iron		557	mg/L	0.041		70	130			A
Nickel		20.5	mg/L	0.021	94	70	130			
Vanadium		18.0	mg/L	0.10	90	70	130			
Zinc		18.8	mg/L	0.010	92	70	130			

Qualifiers:

RL - Analyte reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

ND - Not detected at the reporting limit.



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QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Project: 1273 City of Helena

Report Date: 01/06/09

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7		Batch: B_R122295								
Sample ID: B08121338-003BMSD	8	Sample Matrix Spike Duplicate		Run: SUB-B122295				12/17/08 13:45		
Barium		19.0	mg/L		95	70	130	4	20	
Beryllium		9.37	mg/L	0.0016	94	70	130	4	20	
Chromium		19.9	mg/L	0.021	99	70	130	0.7	20	
Cobalt		19.7	mg/L	0.021	97	70	130	2.5	20	
Iron		569	mg/L	0.041		70	130	2	20	A
Nickel		20.4	mg/L	0.021	93	70	130	0.5	20	
Vanadium		18.3	mg/L	0.10	92	70	130	1.6	20	
Zinc		19.3	mg/L	0.010	95	70	130	2.5	20	
Antimony		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
As		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Cd		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Co		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Cu		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Pb		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Mn		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Se		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Si		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Ag		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Al		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
B		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Br		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
C		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Ca		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Cl		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
K		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Li		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Mg		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Na		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
N		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
O		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
S		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Ti		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
V		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
W		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
X		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Y		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Z		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
As		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Cd		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Co		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Cu		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Pb		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Mn		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Se		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Si		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Ag		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Al		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
B		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Br		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
C		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Ca		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Cl		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
K		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Li		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Mg		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Na		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
N		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
O		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
S		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Ti		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
V		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
W		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
X		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Y		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	
Z		0.0001	mg/L			0.0001	0.0001	0.0001	0.0001	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Project: 1273 City of Helena

Report Date: 01/06/09

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: SUB-B122280
Sample ID: QCS - ME081021A, M 13 Initial Calibration Verification Standard										12/17/08 11:08
Antimony		0.051	mg/L	0.050	101	90	110			
Arsenic		0.051	mg/L	0.0050	102	90	110			
Cadmium		0.025	mg/L	0.0010	100	90	110			
Chromium		0.051	mg/L	0.010	103	90	110			
Cobalt		0.052	mg/L	0.010	103	90	110			
Copper		0.051	mg/L	0.010	102	90	110			
Lead		0.051	mg/L	0.010	103	90	110			
Mercury		0.0020	mg/L	0.0010	99	90	110			
Nickel		0.052	mg/L	0.010	103	90	110			
Selenium		0.052	mg/L	0.0050	103	90	110			
Silver		0.025	mg/L	0.0050	101	90	110			
Thallium		0.052	mg/L	0.10	103	90	110			
Zinc		0.051	mg/L	0.010	102	90	110			
Sample ID: QCS - ME081021A, M 13 Initial Calibration Verification Standard										12/17/08 22:31
Antimony		0.050	mg/L	0.050	100	90	110			
Arsenic		0.051	mg/L	0.0050	101	90	110			
Cadmium		0.026	mg/L	0.0010	102	90	110			
Chromium		0.052	mg/L	0.010	105	90	110			
Cobalt		0.052	mg/L	0.010	104	90	110			
Copper		0.052	mg/L	0.010	103	90	110			
Lead		0.051	mg/L	0.010	101	90	110			
Mercury		0.0019	mg/L	0.0010	94	90	110			
Nickel		0.053	mg/L	0.010	105	90	110			
Selenium		0.051	mg/L	0.0050	102	90	110			
Silver		0.025	mg/L	0.0050	102	90	110			
Thallium		0.051	mg/L	0.10	102	90	110			
Zinc		0.051	mg/L	0.010	101	90	110			
Method: E200.8										Batch: B_R122280
Sample ID: LRB 13 Method Blank										Run: SUB-B122280
										12/17/08 11:49
Antimony		2E-05	mg/L	1E-05						
Arsenic		ND	mg/L	4E-05						
Cadmium		ND	mg/L	9E-06						
Chromium		ND	mg/L	4E-05						
Cobalt		ND	mg/L	1E-05						
Copper		ND	mg/L	7E-05						
Lead		ND	mg/L	8E-06						
Mercury		ND	mg/L	1E-05						
Nickel		ND	mg/L	3E-05						
Selenium		ND	mg/L	0.0001						
Silver		ND	mg/L	3E-05						
Thallium		2E-05	mg/L	7E-06						
Zinc		0.0009	mg/L	3E-05						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Batch: B_R122280
Sample ID: LRB	13	Method Blank		Run: SUB-B122280				12/17/08 11:49		
Sample ID: LFB	13	Laboratory Fortified Blank		Run: SUB-B122280				12/17/08 11:57		
Antimony		0.049	mg/L	0.050	97	85	115			
Arsenic		0.049	mg/L	0.0050	97	85	115			
Cadmium		0.048	mg/L	0.0010	96	85	115			
Chromium		0.049	mg/L	0.010	99	85	115			
Cobalt		0.050	mg/L	0.010	99	85	115			
Copper		0.049	mg/L	0.010	98	85	115			
Lead		0.049	mg/L	0.010	98	85	115			
Mercury		0.00098	mg/L	0.0010	98	85	115			
Nickel		0.049	mg/L	0.010	98	85	115			
Selenium		0.049	mg/L	0.0050	98	85	115			
Silver		0.019	mg/L	0.0050	95	85	115			
Thallium		0.049	mg/L	0.10	98	85	115			
Zinc		0.050	mg/L	0.010	99	85	115			
Sample ID: B08121226-004BMS	13	Sample Matrix Spike		Run: SUB-B122280				12/18/08 01:58		
Antimony		0.0510	mg/L	0.0050	102	70	130			
Arsenic		0.0541	mg/L	0.0050	98	70	130			
Cadmium		0.0466	mg/L	0.0010	93	70	130			
Chromium		0.0483	mg/L	0.010	95	70	130			
Cobalt		0.0485	mg/L	0.010	95	70	130			
Copper		0.0478	mg/L	0.010	93	70	130			
Lead		0.0502	mg/L	0.010	100	70	130			
Mercury		0.000990	mg/L	0.0010	97	70	130			
Nickel		0.0469	mg/L	0.010	91	70	130			
Selenium		0.0628	mg/L	0.0050	96	70	130			
Silver		0.0160	mg/L	0.0050	80	70	130			
Thallium		0.0501	mg/L	0.0050	100	70	130			
Zinc		0.0540	mg/L	0.010	94	70	130			
Sample ID: B08121226-004BMSD	13	Sample Matrix Spike Duplicate		Run: SUB-B122280				12/18/08 02:06		
Antimony		0.0498	mg/L	0.0050	100	70	130	2.2	20	
Arsenic		0.0541	mg/L	0.0050	98	70	130	0.1	20	
Cadmium		0.0467	mg/L	0.0010	93	70	130	0.3	20	
Chromium		0.0486	mg/L	0.010	96	70	130	0.7	20	
Cobalt		0.0492	mg/L	0.010	97	70	130	1.5	20	
Copper		0.0479	mg/L	0.010	93	70	130	0.2	20	
Lead		0.0506	mg/L	0.010	101	70	130	0.7	20	
Mercury		0.00101	mg/L	0.0010	99	70	130	2.3	20	
Nickel		0.0477	mg/L	0.010	93	70	130	1.6	20	
Selenium		0.0633	mg/L	0.0050	97	70	130	0.9	20	
Silver		0.0165	mg/L	0.0050	82	70	130	3.1	20	
Thallium		0.0506	mg/L	0.0050	101	70	130	1	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Batch: B_R122280
Sample ID: B08121226-004BMSD	13	Sample Matrix Spike Duplicate			Run: SUB-B122280			12/18/08 02:06		
Zinc		0.0540	mg/L	0.010	94	70	130	0	20	
Sample ID: B08121359-009AMS	13	Sample Matrix Spike			Run: SUB-B122280			12/18/08 06:28		
Antimony		0.050	mg/L	0.0030	100	70	130			
Arsenic		0.051	mg/L	0.0010	101	70	130			
Cadmium		0.048	mg/L	0.0010	96	70	130			
Chromium		0.047	mg/L	0.010	93	70	130			
Cobalt		0.047	mg/L	0.010	95	70	130			
Copper		1.8	mg/L	0.010		70	130			A
Lead		0.050	mg/L	0.0010	98	70	130			
Mercury		0.00097	mg/L	0.00020	97	70	130			
Nickel		0.053	mg/L	0.010	93	70	130			
Selenium		0.053	mg/L	0.0050	106	70	130			
Silver		0.018	mg/L	0.0050	89	70	130			
Thallium		0.049	mg/L	0.0010	98	70	130			
Zinc		1.1	mg/L	0.010		70	130			A
Sample ID: B08121359-009AMS	13	Sample Matrix Spike Duplicate			Run: SUB-B122280			12/18/08 06:36		
Antimony		0.049	mg/L	0.0030	98	70	130	2.2	20	
Arsenic		0.050	mg/L	0.0010	99	70	130	1.6	20	
Cadmium		0.048	mg/L	0.0010	97	70	130	1.3	20	
Chromium		0.047	mg/L	0.010	93	70	130	0	20	
Cobalt		0.047	mg/L	0.010	94	70	130	0.8	20	
Copper		1.8	mg/L	0.010		70	130	1.4	20	A
Lead		0.050	mg/L	0.0010	97	70	130	0.8	20	
Mercury		0.00098	mg/L	0.00020	98	70	130	1.2	20	
Nickel		0.053	mg/L	0.010	93	70	130	0.3	20	
Selenium		0.052	mg/L	0.0050	103	70	130	2.1	20	
Silver		0.017	mg/L	0.0050	85	70	130	4	20	
Thallium		0.049	mg/L	0.0010	97	70	130	1.2	20	
Zinc		1.1	mg/L	0.010		70	130	0.4	20	A
Sample ID: H08120139-001B	13	Sample Matrix Spike			Run: SUB-B122280			12/18/08 07:06		
Antimony		0.0488	mg/L	0.0050	97	70	130			
Arsenic		0.0487	mg/L	0.0050	96	70	130			
Cadmium		0.0463	mg/L	0.0010	93	70	130			
Chromium		0.0463	mg/L	0.010	91	70	130			
Cobalt		0.0451	mg/L	0.010	90	70	130			
Copper		0.0448	mg/L	0.010	88	70	130			
Lead		0.0475	mg/L	0.010	95	70	130			
Mercury		0.000960	mg/L	0.0010	96	70	130			
Nickel		0.0450	mg/L	0.010	87	70	130			
Selenium		0.0501	mg/L	0.0050	99	70	130			
Silver		0.0176	mg/L	0.0050	88	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Batch: B_R122280
Sample ID: H08120139-001B	13	Sample Matrix Spike			Run: SUB-B122280				12/18/08 07:06	
Thallium		0.0480	mg/L	0.0050	96	70	130			
Zinc		0.0572	mg/L	0.010	95	70	130			
Sample ID: H08120139-001B	13	Sample Matrix Spike Duplicate			Run: SUB-B122280				12/18/08 07:14	
Antimony		0.0458	mg/L	0.0050	92	70	130	6.2	20	
Arsenic		0.0473	mg/L	0.0050	94	70	130	2.9	20	
Cadmium		0.0445	mg/L	0.0010	89	70	130	4	20	
Chromium		0.0451	mg/L	0.010	89	70	130	2.7	20	
Cobalt		0.0441	mg/L	0.010	88	70	130	2.1	20	
Copper		0.0436	mg/L	0.010	86	70	130	2.7	20	
Lead		0.0457	mg/L	0.010	91	70	130	4	20	
Mercury		0.000989	mg/L	0.0010	99	70	130	0	20	
Nickel		0.0439	mg/L	0.010	85	70	130	2.4	20	
Selenium		0.0488	mg/L	0.0050	97	70	130	2.7	20	
Silver		0.0165	mg/L	0.0050	83	70	130	6.4	20	
Thallium		0.0463	mg/L	0.0050	93	70	130	3.5	20	
Zinc		0.0554	mg/L	0.010	92	70	130	3.2	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0		Analytical Run: IC101-H_081217A								
Sample ID: ICV	2	Initial Calibration Verification Standard								12/17/08 14:19
Chloride		24	mg/L	1.0	94	90	110			
Sulfate		97	mg/L	1.0	97	90	110			
Sample ID: CCV	2	Continuing Calibration Verification Standard								12/18/08 08:56
Chloride		24	mg/L	1.0	98	90	110			
Sulfate		99	mg/L	1.0	99	90	110			
Sample ID: CCV	2	Continuing Calibration Verification Standard								12/18/08 12:30
Chloride		24	mg/L	1.0	97	90	110			
Sulfate		97	mg/L	1.0	97	90	110			
Method: E300.0		Batch: R50847								
Sample ID: LFB	2	Laboratory Fortified Blank				Run: IC101-H_081217A				12/17/08 14:58
Chloride		9.7	mg/L	1.0	95	90	110			
Sulfate		37	mg/L	1.0	93	90	110			
Sample ID: MBLK	2	Method Blank				Run: IC101-H_081217A				12/17/08 15:18
Chloride		0.2	mg/L							
Sulfate		ND	mg/L							
Sample ID: H08120134-002B MS	2	Sample Matrix Spike				Run: IC101-H_081217A				12/18/08 09:55
Chloride		49	mg/L	1.0	107	90	110			
Sulfate		200	mg/L	1.0	109	90	110			
Sample ID: H08120134-002B MSD	2	Sample Matrix Spike Duplicate				Run: IC101-H_081217A				12/18/08 10:14
Chloride		47	mg/L	1.0	102	90	110	2.8	20	
Sulfate		200	mg/L	1.0	108	90	110	0.9	20	
Sample ID: H08120144-002A MS	2	Sample Matrix Spike				Run: IC101-H_081217A				12/18/08 14:27
Chloride		36	mg/L	1.0	101	90	110			
Sulfate		180	mg/L	1.0	106	90	110			
Sample ID: H08120144-002A MSD	2	Sample Matrix Spike Duplicate				Run: IC101-H_081217A				12/18/08 14:46
Chloride		36	mg/L	1.0	100	90	110	0.4	20	
Sulfate		180	mg/L	1.0	106	90	110	0.3	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
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QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2								Analytical Run: NUTRIENTS_081215B		
Sample ID: ICV-1		Initial Calibration Verification Standard								12/15/08 17:08
Nitrogen, Nitrate+Nitrite as N		0.9400	mg/L	0.050	94	90	110			
Sample ID: CCV-21		Continuing Calibration Verification Standard								12/15/08 17:48
Nitrogen, Nitrate+Nitrite as N		0.4600	mg/L	0.050	92	90	110			
Sample ID: CCV-35		Continuing Calibration Verification Standard								12/15/08 18:16
Nitrogen, Nitrate+Nitrite as N		0.4700	mg/L	0.050	94	90	110			
Method: E353.2								Batch: A2008-12-15_5_NO3_01		
Sample ID: LCS-2		Laboratory Control Sample				Run: NUTRIENTS_081215B				12/15/08 17:10
Nitrogen, Nitrate+Nitrite as N		14.80	mg/L	0.095	97	90	110			
Sample ID: LFB-3		Laboratory Fortified Blank				Run: NUTRIENTS_081215B				12/15/08 17:12
Nitrogen, Nitrate+Nitrite as N		0.5300	mg/L	0.050	106	90	110			
Sample ID: MBLK-7		Method Blank				Run: NUTRIENTS_081215B				12/15/08 17:20
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.010						
Sample ID: H08120132-001AMS		Sample Matrix Spike				Run: NUTRIENTS_081215B				12/15/08 17:58
Nitrogen, Nitrate+Nitrite as N		1.35	mg/L	0.050	81	90	110			S
Sample ID: H08120132-001AMSD		Sample Matrix Spike Duplicate				Run: NUTRIENTS_081215B				12/15/08 18:00
Nitrogen, Nitrate+Nitrite as N		1.38	mg/L	0.050	84	90	110	2.2	20	S
Sample ID: H08120135-002AMS		Sample Matrix Spike				Run: NUTRIENTS_081215B				12/15/08 18:30
Nitrogen, Nitrate+Nitrite as N		1.46	mg/L	0.050	82	90	110			S
Sample ID: H08120135-002AMSD		Sample Matrix Spike Duplicate				Run: NUTRIENTS_081215B				12/15/08 18:32
Nitrogen, Nitrate+Nitrite as N		1.51	mg/L	0.050	87	90	110	3.4	20	S

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPECTRO_081215A
Sample ID: CCV	Continuing Calibration Verification Standard									12/15/08 19:00
Oxygen Demand, Chemical (COD)		49	mg/L	1.0	97	90	110			
Method: E410.4										Batch: R50826
Sample ID: MB-R50826	Method Blank									12/15/08 19:00
Oxygen Demand, Chemical (COD)		ND	mg/L							
Run: SPECTRO_081215A										
Sample ID: LCS-R50826	Laboratory Control Sample									12/15/08 19:00
Oxygen Demand, Chemical (COD)		310	mg/L	1.0	104	90	110			
Run: SPECTRO_081215A										
Sample ID: H08110215-005BDUP	Sample Duplicate									12/15/08 19:00
Oxygen Demand, Chemical (COD)		48	mg/L	1.0				2.9	20	
Run: SPECTRO_081215A										
Sample ID: H08120134-002DMS	Sample Matrix Spike									12/15/08 19:00
Oxygen Demand, Chemical (COD)		55	mg/L	1.0	99	90	110			
Run: SPECTRO_081215A										
Sample ID: H08120134-002DMSD	Sample Matrix Spike Duplicate									12/15/08 19:00
Oxygen Demand, Chemical (COD)		55	mg/L	1.0	99	90	110	0.5	20	
Run: SPECTRO_081215A										
Method: Kelada mod										Batch: B_36495
Sample ID: LCS-4	Laboratory Control Sample									12/24/08 09:55
Cyanide, Total		0.106	mg/L	0.0050	106	90	110			
Run: SUB-B122612										
Sample ID: MBLK-6	Method Blank									12/24/08 09:59
Cyanide, Total		ND	mg/L	0.003						
Run: SUB-B122612										
Sample ID: B08121215-001CMS	Sample Matrix Spike									12/24/08 10:06
Cyanide, Total		0.156	mg/L	0.0050	107	90	110			
Run: SUB-B122612										
Sample ID: B08121215-001CMSD	Sample Matrix Spike Duplicate									12/24/08 10:08
Cyanide, Total		0.161	mg/L	0.0050	111	90	110		S	
Run: SUB-B122612										
Sample ID: MBLK-4	Method Blank									12/26/08 13:31
Cyanide, Total		ND	mg/L	0.003						
Run: SUB-B122663										
Sample ID: LCS-5	Laboratory Control Sample									12/26/08 13:33
Cyanide, Total		0.104	mg/L	0.0050	104	90	110			
Run: SUB-B122663										
Sample ID: H08120134-007E	Sample Matrix Spike									12/26/08 14:31
Cyanide, Total		0.118	mg/L	0.0050	87	90	110		S	
Run: SUB-B122663										
Sample ID: H08120134-007E	Sample Matrix Spike Duplicate									12/26/08 14:32
Cyanide, Total		0.115	mg/L	0.0050	84	90	110		S	
Run: SUB-B122663										

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Project: 1273 City of Helena

Report Date: 01/06/09

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: Kelada mod								Analytical Run: SUB-B122301		
Sample ID: ICV-1								Initial Calibration Verification Standard		
Cyanide, Total								0.148 mg/L 0.0050 99 90 110		
12/17/08 11:27										
Method: Kelada mod								Batch: B_R122301		
Sample ID: LFB-2								Laboratory Fortified Blank		
Cyanide, Total								0.106 mg/L 0.0050 105 90 110		
12/17/08 11:29								Run: SUB-B122301		
Sample ID: MBLK-3								Method Blank		
Cyanide, Total								ND mg/L 0.003		
12/17/08 11:31								Run: SUB-B122301		
Sample ID: B08121266-001EMS								Sample Matrix Spike		
Cyanide, Total								0.0951 mg/L 0.0050 95 90 110		
12/17/08 16:13								Run: SUB-B122301		
Sample ID: B08121266-001EMSD								Sample Matrix Spike Duplicate		
Cyanide, Total								0.0974 mg/L 0.0050 97 90 110		
12/17/08 16:14								Run: SUB-B122301		
Sample ID: B08121389-001BMS								Sample Matrix Spike		
Cyanide, Total								0.113 mg/L 0.0050 81 90 110		
12/17/08 18:16								Run: SUB-B122301		
Sample ID: B08121389-001BMDS								Sample Matrix Spike Duplicate		
Cyanide, Total								0.115 mg/L 0.0050 83 90 110		
12/17/08 18:18								Run: SUB-B122301		
Method: Kelada mod								Analytical Run: SUB-B122612		
Sample ID: ICV-1								Initial Calibration Verification Standard		
Cyanide, Total								0.158 mg/L 0.0050 106 90 110		
12/24/08 09:42										
Method: Kelada mod								Analytical Run: SUB-B122663		
Sample ID: ICV-1								Initial Calibration Verification Standard		
Cyanide, Total								0.153 mg/L 0.0050 102 90 110		
12/26/08 13:26										

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B		Analytical Run: 1SATURN_081222A								
Sample ID: CCV122108A		54 Continuing Calibration Verification Standard								12/21/08 10:20
Acetone		46.0	ug/L	20	92	70	130			
Acrylonitrile		42.4	ug/L	20	85	70	130			
Benzene		4.52	ug/L	1.0	90	70	130			
Bromochloromethane		5.84	ug/L	1.0	117	70	130			
Bromodichloromethane		4.44	ug/L	1.0	89	70	130			
Bromoform		4.56	ug/L	1.0	91	70	130			
Bromomethane		5.72	ug/L	1.0	114	70	130			
Carbon disulfide		4.60	ug/L	1.0	92	70	130			
Carbon tetrachloride		5.28	ug/L	1.0	106	70	130			
Chlorobenzene		4.96	ug/L	1.0	99	70	130			
Chlorodibromomethane		4.24	ug/L	1.0	85	70	130			
Chloroethane		4.48	ug/L	1.0	90	70	130			
Chloroform		5.24	ug/L	1.0	105	80	120			
Chloromethane		6.04	ug/L	1.0	121	70	130			
1,2-Dibromo-3-chloropropane		4.32	ug/L	1.0	86	70	130			
1,2-Dibromoethane		4.56	ug/L	1.0	91	70	130			
Dibromomethane		4.16	ug/L	1.0	83	70	130			
1,2-Dichlorobenzene		5.12	ug/L	1.0	102	70	130			
1,4-Dichlorobenzene		5.04	ug/L	1.0	101	70	130			
trans-1,4-Dichloro-2-butene		4.76	ug/L	1.0	95	70	130			
Dichlorodifluoromethane		4.88	ug/L	1.0	98	70	130			
1,1-Dichloroethane		5.48	ug/L	1.0	110	70	130			
1,2-Dichloroethane		5.44	ug/L	1.0	109	70	130			
1,1-Dichloroethene		5.08	ug/L	1.0	102	80	120			
cis-1,2-Dichloroethene		5.32	ug/L	1.0	106	70	130			
trans-1,2-Dichloroethene		5.24	ug/L	1.0	105	70	130			
1,2-Dichloropropane		4.56	ug/L	1.0	91	80	120			
cis-1,3-Dichloropropene		4.72	ug/L	1.0	94	70	130			
trans-1,3-Dichloropropene		4.52	ug/L	1.0	90	70	130			
Ethylbenzene		4.84	ug/L	1.0	97	80	120			
2-Hexanone		45.2	ug/L	20	90	70	130			
Iodomethane		4.20	ug/L	1.0	84	70	130			
Methyl ethyl ketone		48.8	ug/L	20	98	70	130			
Methyl isobutyl ketone		43.6	ug/L	20	87	70	130			
Methylene chloride		5.12	ug/L	1.0	102	70	130			
Styrene		4.60	ug/L	1.0	92	70	130			
1,1,1,2-Tetrachloroethane		4.40	ug/L	1.0	88	70	130			
1,1,2,2-Tetrachloroethane		4.80	ug/L	1.0	96	70	130			
Tetrachloroethene		4.96	ug/L	1.0	99	70	130			
Toluene		5.20	ug/L	1.0	104	80	120			
1,1,1-Trichloroethane		5.28	ug/L	1.0	106	70	130			
1,1,2-Trichloroethane		4.96	ug/L	1.0	99	70	130			
Trichloroethene		5.20	ug/L	1.0	104	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Project: 1273 City of Helena

Report Date: 01/06/09

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B								Analytical Run: 1SATURN_081222A		
Sample ID: CCV122108A	54 Continuing Calibration Verification Standard									12/21/08 10:20
Trichlorofluoromethane		5.24	ug/L	1.0	105	70	130			
1,2,3-Trichloropropane		4.56	ug/L	1.0	91	70	130			
Vinyl acetate		4.88	ug/L	1.0	98	70	130			
Vinyl chloride		5.60	ug/L	1.0	112	80	120			
m+p-Xylenes		10.2	ug/L	1.0	102	70	130			
o-Xylene		5.08	ug/L	1.0	102	70	130			
Xylenes, Total		15.2	ug/L	1.0	102	70	130			
Surr: 1,2-Dichloroethane-d4				1.0	109	70	130			
Surr: Dibromofluoromethane				1.0	87	70	130			
Surr: p-Bromofluorobenzene				1.0	96	70	130			
Surr: Toluene-d8				1.0	106	70	130			

Method: SW8260B								Batch: R50894		
Sample ID: LCS122108A	54 Laboratory Control Sample									12/21/08 10:55
				Run: 1SATURN_081222A						
Acetone		42.0	ug/L	20	84	70	130			
Acrylonitrile		38.1	ug/L	20	76	70	130			
Benzene		4.72	ug/L	1.0	94	70	130			
Bromochloromethane		5.60	ug/L	1.0	112	70	130			
Bromodichloromethane		4.92	ug/L	1.0	98	70	130			
Bromoform		4.36	ug/L	1.0	87	70	130			
Bromomethane		5.64	ug/L	1.0	113	70	130			
Carbon disulfide		4.28	ug/L	1.0	86	70	130			
Carbon tetrachloride		5.32	ug/L	1.0	106	70	130			
Chlorobenzene		5.20	ug/L	1.0	104	70	130			
Chlorodibromomethane		4.32	ug/L	1.0	86	70	130			
Chloroethane		4.92	ug/L	1.0	98	70	130			
Chloroform		5.08	ug/L	1.0	102	70	130			
Chloromethane		5.80	ug/L	1.0	116	70	130			
1,2-Dibromo-3-chloropropane		4.84	ug/L	1.0	97	70	130			
1,2-Dibromoethane		4.64	ug/L	1.0	93	70	130			
Dibromomethane		4.48	ug/L	1.0	90	70	130			
1,2-Dichlorobenzene		5.04	ug/L	1.0	101	70	130			
1,4-Dichlorobenzene		5.24	ug/L	1.0	105	70	130			
trans-1,4-Dichloro-2-butene		5.24	ug/L	1.0	105	70	130			
Dichlorodifluoromethane		4.88	ug/L	1.0	98	70	130			
1,1-Dichloroethane		5.52	ug/L	1.0	110	70	130			
1,2-Dichloroethane		5.68	ug/L	1.0	114	70	130			
1,1-Dichloroethene		4.88	ug/L	1.0	98	70	130			
cis-1,2-Dichloroethene		5.16	ug/L	1.0	103	70	130			
trans-1,2-Dichloroethene		5.16	ug/L	1.0	103	70	130			
1,2-Dichloropropane		4.76	ug/L	1.0	95	70	130			
cis-1,3-Dichloropropene		5.00	ug/L	1.0	100	70	130			
trans-1,3-Dichloropropene		4.60	ug/L	1.0	92	70	130			
Ethylbenzene		5.20	ug/L	1.0	104	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R50894
Sample ID: LCS122108A	54	Laboratory Control Sample				Run: 1SATURN_081222A				12/21/08 10:55
2-Hexanone		43.2	ug/L	20	86	70	130			
Iodomethane		4.16	ug/L	1.0	83	70	130			
Methyl ethyl ketone		44.0	ug/L	20	88	70	130			
Methyl isobutyl ketone		41.2	ug/L	20	82	70	130			
Methylene chloride		4.80	ug/L	1.0	96	70	130			
Styrene		4.80	ug/L	1.0	96	70	130			
1,1,1,2-Tetrachloroethane		4.64	ug/L	1.0	93	70	130			
1,1,2,2-Tetrachloroethane		4.88	ug/L	1.0	98	70	130			
Tetrachloroethene		4.96	ug/L	1.0	99	70	130			
Toluene		5.48	ug/L	1.0	110	70	130			
1,1,1-Trichloroethane		5.36	ug/L	1.0	107	70	130			
1,1,2-Trichloroethane		4.80	ug/L	1.0	96	70	130			
Trichloroethene		5.44	ug/L	1.0	109	70	130			
Trichlorofluoromethane		5.08	ug/L	1.0	102	70	130			
1,2,3-Trichloropropane		5.00	ug/L	1.0	100	70	130			
Vinyl acetate		4.60	ug/L	1.0	92	70	130			
Vinyl chloride		5.48	ug/L	1.0	110	70	130			
m+p-Xylenes		10.8	ug/L	1.0	108	70	130			
o-Xylene		5.32	ug/L	1.0	106	70	130			
Xylenes, Total		16.1	ug/L	1.0	107	70	130			
Surr: 1,2-Dichloroethane-d4				1.0	104	70	130			
Surr: Dibromofluoromethane				1.0	84	70	130			
Surr: p-Bromofluorobenzene				1.0	93	70	130			
Surr: Toluene-d8				1.0	104	70	130			
Sample ID: MBLK122108A	54	Method Blank				Run: 1SATURN_081222A				12/21/08 12:41
Acetone		ND	ug/L	20						
Acrylonitrile		ND	ug/L	20						
Benzene		ND	ug/L	1.0						
Bromochloromethane		ND	ug/L	1.0						
Bromodichloromethane		ND	ug/L	1.0						
Bromoform		ND	ug/L	1.0						
Bromomethane		ND	ug/L	1.0						
Carbon disulfide		ND	ug/L	1.0						
Carbon tetrachloride		ND	ug/L	1.0						
Chlorobenzene		ND	ug/L	1.0						
Chlorodibromomethane		ND	ug/L	1.0						
Chloroethane		ND	ug/L	1.0						
Chloroform		ND	ug/L	1.0						
Chloromethane		ND	ug/L	1.0						
1,2-Dibromo-3-chloropropane		ND	ug/L	1.0						
1,2-Dibromoethane		ND	ug/L	1.0						
Dibromomethane		ND	ug/L	1.0						
1,2-Dichlorobenzene		ND	ug/L	1.0						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Project: 1273 City of Helena

Report Date: 01/06/09

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R50894
Sample ID: MBLK122108A	54	Method Blank					Run: 1SATURN_081222A			12/21/08 12:41
1,4-Dichlorobenzene		ND	ug/L		1.0					
trans-1,4-Dichloro-2-butene		ND	ug/L		1.0					
Dichlorodifluoromethane		ND	ug/L		1.0					
1,1-Dichloroethane		ND	ug/L		1.0					
1,2-Dichloroethane		ND	ug/L		1.0					
1,1-Dichloroethene		ND	ug/L		1.0					
cis-1,2-Dichloroethene		ND	ug/L		1.0					
trans-1,2-Dichloroethene		ND	ug/L		1.0					
1,2-Dichloropropane		ND	ug/L		1.0					
cis-1,3-Dichloropropene		ND	ug/L		1.0					
trans-1,3-Dichloropropene		ND	ug/L		1.0					
Ethylbenzene		ND	ug/L		1.0					
2-Hexanone		ND	ug/L		20					
Iodomethane		ND	ug/L		1.0					
Methyl ethyl ketone		ND	ug/L		20					
Methyl isobutyl ketone		ND	ug/L		20					
Methylene chloride		ND	ug/L		1.0					
Styrene		ND	ug/L		1.0					
1,1,1,2-Tetrachloroethane		ND	ug/L		1.0					
1,1,2,2-Tetrachloroethane		ND	ug/L		1.0					
Tetrachloroethene		ND	ug/L		1.0					
Toluene		ND	ug/L		1.0					
1,1,1-Trichloroethane		ND	ug/L		1.0					
1,1,2-Trichloroethane		ND	ug/L		1.0					
Trichloroethene		ND	ug/L		1.0					
Trichlorofluoromethane		ND	ug/L		1.0					
1,2,3-Trichloropropane		ND	ug/L		1.0					
Vinyl acetate		ND	ug/L		1.0					
Vinyl chloride		ND	ug/L		1.0					
m+p-Xylenes		ND	ug/L		1.0					
o-Xylene		ND	ug/L		1.0					
Xylenes, Total		ND	ug/L		1.0					
Surr: 1,2-Dichloroethane-d4				1.0	102	70	130			
Surr: Dibromofluoromethane				1.0	82	70	130			
Surr: p-Bromofluorobenzene				1.0	91	70	130			
Surr: Toluene-d8				1.0	102	70	130			
Sample ID: H08120197-001AMS	54	Sample Matrix Spike					Run: 1SATURN_081222A			12/21/08 19:07
Acetone		94.4	ug/L	40	94	70	130			
Acrylonitrile		94.4	ug/L	40	94	70	130			
Benzene		9.12	ug/L	2.0	91	70	130			
Bromochloromethane		10.6	ug/L	2.0	106	70	130			
Bromodichloromethane		9.12	ug/L	2.0	91	70	130			
Bromoform		7.68	ug/L	2.0	77	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R50894
Sample ID: H08120197-001AMS	54	Sample Matrix Spike			Run: 1SATURN_081222A				12/21/08 19:07	
Bromomethane		11.5	ug/L	2.0	115	70	130			
Carbon disulfide		9.76	ug/L	2.0	98	70	130			
Carbon tetrachloride		9.12	ug/L	2.0	91	70	130			
Chlorobenzene		9.12	ug/L	2.0	91	70	130			
Chlorodibromomethane		7.90	ug/L	2.0	79	70	130			
Chloroethane		9.04	ug/L	2.0	90	70	130			
Chloroform		11.0	ug/L	2.0	98	70	130			
Chloromethane		10.7	ug/L	2.0	107	70	130			
1,2-Dibromo-3-chloropropane		8.48	ug/L	2.0	85	70	130			
1,2-Dibromoethane		8.48	ug/L	2.0	85	70	130			
Dibromomethane		8.56	ug/L	2.0	86	70	130			
1,2-Dichlorobenzene		8.72	ug/L	2.0	87	70	130			
1,4-Dichlorobenzene		8.48	ug/L	2.0	85	70	130			
trans-1,4-Dichloro-2-butene		9.04	ug/L	2.0	90	70	130			
Dichlorodifluoromethane		9.84	ug/L	2.0	96	70	130			
1,1-Dichloroethane		9.76	ug/L	2.0	96	70	130			
1,2-Dichloroethane		10.4	ug/L	2.0	104	70	130			
1,1-Dichloroethene		9.52	ug/L	2.0	95	70	130			
cis-1,2-Dichloroethene		9.68	ug/L	2.0	97	70	130			
trans-1,2-Dichloroethene		9.44	ug/L	2.0	94	70	130			
1,2-Dichloropropane		8.72	ug/L	2.0	87	70	130			
cis-1,3-Dichloropropene		8.56	ug/L	2.0	86	70	130			
trans-1,3-Dichloropropene		8.80	ug/L	2.0	88	70	130			
Ethylbenzene		8.88	ug/L	2.0	89	70	130			
2-Hexanone		93.6	ug/L	40	94	70	130			
Iodomethane		8.48	ug/L	2.0	85	70	130			
Methyl ethyl ketone		106	ug/L	40	106	70	130			
Methyl isobutyl ketone		92.8	ug/L	40	93	70	130			
Methylene chloride		10.2	ug/L	2.0	102	70	130			
Styrene		8.72	ug/L	2.0	87	70	130			
1,1,1,2-Tetrachloroethane		8.72	ug/L	2.0	87	70	130			
1,1,2,2-Tetrachloroethane		8.32	ug/L	2.0	83	70	130			
Tetrachloroethene		9.04	ug/L	2.0	80	70	130			
Toluene		9.28	ug/L	2.0	93	70	130			
1,1,1-Trichloroethane		9.60	ug/L	2.0	96	70	130			
1,1,2-Trichloroethane		8.72	ug/L	2.0	87	70	130			
Trichloroethene		8.80	ug/L	2.0	88	70	130			
Trichlorofluoromethane		9.92	ug/L	2.0	96	70	130			
1,2,3-Trichloropropane		8.48	ug/L	2.0	85	70	130			
Vinyl acetate		8.88	ug/L	2.0	89	70	130			
Vinyl chloride		10.2	ug/L	2.0	102	70	130			
m+p-Xylenes		17.4	ug/L	2.0	87	70	130			
o-Xylene		9.36	ug/L	2.0	94	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R50894
Sample ID: H08120197-001AMS	54	Sample Matrix Spike		Run: 1SATURN_081222A					12/21/08 19:07	
Xylenes, Total		26.8	ug/L	2.0	89	70	130			
Surr: 1,2-Dichloroethane-d4				2.0	115	70	130			
Surr: Dibromofluoromethane				2.0	93	70	130			
Surr: p-Bromofluorobenzene				2.0	94	70	130			
Surr: Toluene-d8				2.0	102	70	130			
Sample ID: H08120197-001AMSD	54	Sample Matrix Spike Duplicate		Run: 1SATURN_081222A					12/21/08 19:36	
Acetone		101	ug/L	40	101	70	130	6.6	20	
Acrylonitrile		94.4	ug/L	40	94	70	130	0	20	
Benzene		10.4	ug/L	2.0	104	70	130	13	20	
Bromochloromethane		11.6	ug/L	2.0	116	70	130	9.4	20	
Bromodichloromethane		9.20	ug/L	2.0	92	70	130	0.9	20	
Bromoforn		8.32	ug/L	2.0	83	70	130	8	20	
Bromomethane		11.2	ug/L	2.0	112	70	130	2.8	20	
Carbon disulfide		10.2	ug/L	2.0	102	70	130	4.8	20	
Carbon tetrachloride		10.1	ug/L	2.0	101	70	130	10	20	
Chlorobenzene		9.20	ug/L	2.0	92	70	130	0.9	20	
Chlorodibromomethane		8.64	ug/L	2.0	86	70	130	8.9	20	
Chloroethane		10.1	ug/L	2.0	101	70	130	11	20	
Chloroform		11.5	ug/L	2.0	102	70	130	4.3	20	
Chloromethane		10.5	ug/L	2.0	105	70	130	2.3	20	
1,2-Dibromo-3-chloropropane		9.04	ug/L	2.0	90	70	130	6.4	20	
1,2-Dibromoethane		9.12	ug/L	2.0	91	70	130	7.3	20	
Dibromomethane		8.72	ug/L	2.0	87	70	130	1.9	20	
1,2-Dichlorobenzene		8.80	ug/L	2.0	88	70	130	0.9	20	
1,4-Dichlorobenzene		8.80	ug/L	2.0	88	70	130	3.7	20	
trans-1,4-Dichloro-2-butene		8.80	ug/L	2.0	88	70	130	2.7	20	
Dichlorodifluoromethane		9.68	ug/L	2.0	94	70	130	1.6	20	
1,1-Dichloroethane		10.8	ug/L	2.0	106	70	130	10	20	
1,2-Dichloroethane		10.7	ug/L	2.0	107	70	130	3	20	
1,1-Dichloroethene		9.84	ug/L	2.0	98	70	130	3.3	20	
cis-1,2-Dichloroethene		10.2	ug/L	2.0	102	70	130	4.8	20	
trans-1,2-Dichloroethene		9.84	ug/L	2.0	98	70	130	4.1	20	
1,2-Dichloropropane		9.44	ug/L	2.0	94	70	130	7.9	20	
cis-1,3-Dichloropropene		9.28	ug/L	2.0	93	70	130	8.1	20	
trans-1,3-Dichloropropene		9.52	ug/L	2.0	95	70	130	7.9	20	
Ethylbenzene		9.44	ug/L	2.0	94	70	130	6.1	20	
2-Hexanone		100	ug/L	40	100	70	130	6.6	20	
Iodomethane		9.44	ug/L	2.0	94	70	130	11	20	
Methyl ethyl ketone		112	ug/L	40	112	70	130	5.9	20	
Methyl isobutyl ketone		94.4	ug/L	40	94	70	130	1.7	20	
Methylene chloride		10.3	ug/L	2.0	103	70	130	0.8	20	
Styrene		9.44	ug/L	2.0	94	70	130	7.9	20	
1,1,1,2-Tetrachloroethane		9.04	ug/L	2.0	90	70	130	3.6	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



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QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/06/09

Project: 1273 City of Helena

Work Order: H08120134

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R50894
Sample ID: H08120197-001AMSD 54 Sample Matrix Spike Duplicate										Run: 1SATURN_081222A 12/21/08 19:36
1,1,2,2-Tetrachloroethane		9.20	ug/L	2.0	92	70	130	10	20	
Tetrachloroethene		10.1	ug/L	2.0	91	70	130	11	20	
Toluene		10.4	ug/L	2.0	104	70	130	11	20	
1,1,1-Trichloroethane		10.3	ug/L	2.0	103	70	130	7.2	20	
1,1,2-Trichloroethane		10.1	ug/L	2.0	101	70	130	14	20	
Trichloroethene		9.76	ug/L	2.0	98	70	130	10	20	
Trichlorofluoromethane		10.5	ug/L	2.0	102	70	130	5.5	20	
1,2,3-Trichloropropane		9.04	ug/L	2.0	90	70	130	6.4	20	
Vinyl acetate		11.2	ug/L	2.0	112	70	130	23	20	R
Vinyl chloride		10.4	ug/L	2.0	104	70	130	1.6	20	
m+p-Xylenes		19.8	ug/L	2.0	99	70	130	12	20	
o-Xylene		10.0	ug/L	2.0	100	70	130	6.6	20	
Xylenes, Total		29.8	ug/L	2.0	99	70	130	10	20	
Surr: 1,2-Dichloroethane-d4				2.0	106	70	130	0	20	
Surr: Dibromofluoromethane				2.0	90	70	130	0	20	
Surr: p-Bromofluorobenzene				2.0	90	70	130	0	20	
Surr: Toluene-d8				2.0	101	70	130	0	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

R - RPD exceeds advisory limit.



2727 Airport Road • Helena, Montana 59601 • (406) 443-4150

[illegible]

Energy Laboratories Inc

Workorder Receipt Checklist



H08120134

Hydrometrics Inc

Login completed by: Roxanne L. Tubbs

Date and Time Received: 12/12/2008 9:00 AM

 Reviewed by: *rtb*

Received by: rit

Reviewed Date: 12/17/08

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☒	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☒
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☒
Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	
Samples in proper container/bottle?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	
All samples received within holding time?	Yes ☒	No ☐	
Container/Temp Blank temperature:	3.8°C		
Water - VOA vials have zero headspace?	Yes ☒	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☒	No ☐	Not Applicable ☐

Contact and Corrective Action Comments:

None

Table 1. Commons and Metals

1) Antimony	13) Mercury
2) Arsenic	14) Nitrate
3) Barium	15) Nickel
4) Beryllium	16) Selenium
5) Cadmium	17) Silver
6) Chloride	18) Sulfate (SO ₄)
7) Chromium	19) Thallium
8) Cobalt	20) Vanadium
9) Copper	21) Zinc
10) Cyanide	22) Chemical Oxygen Demand (COD)
11) Iron	23) pH
12) Lead	24) Specific Conductance

Table 2. Volatile Organic Compounds (EPA Method 8260)

1) Acetone	25) trans-1,3-Dichloropropene
2) Acrylonitrile	26) Ethylbenzene
3) Benzene	27) 2-Hexanone
4) Bromochloromethane	28) Methyl bromide
5) Bromoform	29) Methyl chloride
6) Carbon Disulfide	30) Methylene bromide
7) Carbon Tetrachloride	31) Methylene chloride
8) Chlorobenzene	32) Methyl ethyl ketone
9) Chloroethane	33) Methyl iodide
10) Chloroform	34) 4-Methyl-2-pentanone
11) Chlorodibromomethane	35) Styrene
12) 1,2-Dibromo-3-chloropropane	36) 1,1,1,2-Tetrachloroethane
13) 1,2-Dibromoethane	37) 1,1,2,2-Tetrachloroethane
14) 1,2-Dichlorobenzene	38) Tetrachloroethylene
15) 1,4-Dichlorobenzene	39) Toluene
16) trans-1,4-Dichloro-2-butene	40) 1,1,1-Trichloroethane
17) Dichlorodifluoromethane	41) 1,1,2-Trichloroethane
18) 1,1-Dichloroethane	42) Trichloroethene
19) 1,2-Dichloroethane	43) Trichlorofluoromethane
20) 1,1-Dichloroethylene	44) 1,2,3-Trichloropropane
21) cis-1,2-Dichloroethylene	45) Vinyl acetate
22) trans-1,2-Dichloroethylene	46) Vinyl chloride
23) 1,2-Dichloropropane	47) Xylenes
24) cis-1,3-Dichloropropene	



ANALYTICAL SUMMARY REPORT

January 05, 2009

Richard Lane

Hydrometrics Inc-Helena

3020 Bozeman Ave

Helena, MT 59601-

Workorder No.: H08120197

Project Name: 1273 City of Helena

Energy Laboratories Inc received the following 1 sample for Hydrometrics Inc-Helena on 12/19/2008 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H08120197-001	HL-0812-110	12/18/08 17:00	12/19/08	Aqueous	8260-Volatile Organic Comp, 40 CFR Part 258 App I

BRANCH LABORATORY LOCATIONS

eli-b - Energy Laboratories, Inc. - Billings, MT, EPA # MT00005
eli-c - Energy Laboratories, Inc. - Casper, WY, EPA# WY00002
eli-g - Energy Laboratories, Inc. - Gillette, WY, EPA# WY00006
eli-h - Energy Laboratories, Inc. - Helena, MT, EPA# MT00945
eli-r - Energy Laboratories, Inc. - Rapid City, SD, EPA# SD00012
eli-t - Energy Laboratories, Inc. - College Station, TX, EPA# TX01520

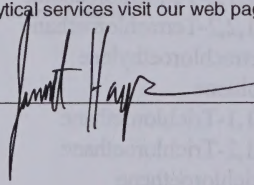
SUBCONTRACTING ANALYSIS

Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES, INC. will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories are indicated within the Laboratory Analytical Report.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)

Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

ELI appreciates the opportunity to provide you with this analytical service. For additional information, including certifications, and analytical services visit our web page www.energylab.com.

Report Approved By: 

JAN - 7 2009



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
Toll Free 877.472.0711 * 406.442.0711 * FAX 406.442.0712 * helena@energylab.com

LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120197-001
Client Sample ID: HL-0812-110

Res. #16

Report Date: 01/05/09
Collection Date: 12/18/08 17:00
Date Received: 12/19/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	12/21/08 13:40 / jdh
Acrylonitrile	ND	ug/L		20		SW8260B	12/21/08 13:40 / jdh
Benzene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Bromochloromethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Bromodichloromethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Bromoform	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Bromomethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Carbon disulfide	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Chlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Chloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Chloroform	1.3	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Chloromethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Dibromomethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
trans-1,4-Dichloro-2-butene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Dichlorodifluoromethane	0.29	ug/L	J	1.0		SW8260B	12/21/08 13:40 / jdh
1,1-Dichloroethane	0.20	ug/L	J	1.0		SW8260B	12/21/08 13:40 / jdh
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Ethylbenzene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
2-Hexanone	ND	ug/L		20		SW8260B	12/21/08 13:40 / jdh
Iodomethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	12/21/08 13:40 / jdh
Methyl isobutyl ketone	ND	ug/L		20		SW8260B	12/21/08 13:40 / jdh
Methylene chloride	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Styrene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Tetrachloroethene	1.0	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Toluene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Trichloroethene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

J - Estimated value. The analyte was present but less than the reporting limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
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LABORATORY ANALYTICAL REPORT

Client: Hydrometrics Inc-Helena
Project: 1273 City of Helena
Lab ID: H08120197-001
Client Sample ID: HL-0812-110

Report Date: 01/05/09
Collection Date: 12/18/08 17:00
Date Received: 12/19/08
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	0.32	ug/L	J	1.0		SW8260B	12/21/08 13:40 / jdh
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Vinyl acetate	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Vinyl chloride	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
m+p-Xylenes	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
o-Xylene	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Xylenes, Total	ND	ug/L		1.0		SW8260B	12/21/08 13:40 / jdh
Surr: 1,2-Dichloroethane-d4	105	%REC		70-130		SW8260B	12/21/08 13:40 / jdh
Surr: Dibromofluoromethane	88.0	%REC		70-130		SW8260B	12/21/08 13:40 / jdh
Surr: p-Bromofluorobenzene	90.0	%REC		70-130		SW8260B	12/21/08 13:40 / jdh
Surr: Toluene-d8	98.0	%REC		70-130		SW8260B	12/21/08 13:40 / jdh

**Report
Definitions:**

RL - Analyte reporting limit.
QCL - Quality control limit.
J - Estimated value. The analyte was present but less than the reporting limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
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QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/05/09

Project: 1273 City of Helena

Work Order: H08120197

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B		Analytical Run: 1SATURN_081222A								
Sample ID: CCV122108A	54	Continuing Calibration Verification Standard								12/21/08 10:20
Acetone		46.0	ug/L	20	92	70	130			
Acrylonitrile		42.4	ug/L	20	85	70	130			
Benzene		4.52	ug/L	1.0	90	70	130			
Bromochloromethane		5.84	ug/L	1.0	117	70	130			
Bromodichloromethane		4.44	ug/L	1.0	89	70	130			
Bromoform		4.56	ug/L	1.0	91	70	130			
Bromomethane		5.72	ug/L	1.0	114	70	130			
Carbon disulfide		4.60	ug/L	1.0	92	70	130			
Carbon tetrachloride		5.28	ug/L	1.0	106	70	130			
Chlorobenzene		4.96	ug/L	1.0	99	70	130			
Chlorodibromomethane		4.24	ug/L	1.0	85	70	130			
Chloroethane		4.48	ug/L	1.0	90	70	130			
Chloroform		5.24	ug/L	1.0	105	80	120			
Chloromethane		6.04	ug/L	1.0	121	70	130			
1,2-Dibromo-3-chloropropane		4.32	ug/L	1.0	86	70	130			
1,2-Dibromoethane		4.56	ug/L	1.0	91	70	130			
Dibromomethane		4.16	ug/L	1.0	83	70	130			
1,2-Dichlorobenzene		5.12	ug/L	1.0	102	70	130			
1,4-Dichlorobenzene		5.04	ug/L	1.0	101	70	130			
trans-1,4-Dichloro-2-butene		4.76	ug/L	1.0	95	70	130			
Dichlorodifluoromethane		4.88	ug/L	1.0	98	70	130			
1,1-Dichloroethane		5.48	ug/L	1.0	110	70	130			
1,2-Dichloroethane		5.44	ug/L	1.0	109	70	130			
1,1-Dichloroethene		5.08	ug/L	1.0	102	80	120			
cis-1,2-Dichloroethene		5.32	ug/L	1.0	106	70	130			
trans-1,2-Dichloroethene		5.24	ug/L	1.0	105	70	130			
1,2-Dichloropropane		4.56	ug/L	1.0	91	80	120			
cis-1,3-Dichloropropene		4.72	ug/L	1.0	94	70	130			
trans-1,3-Dichloropropene		4.52	ug/L	1.0	90	70	130			
Ethylbenzene		4.84	ug/L	1.0	97	80	120			
2-Hexanone		45.2	ug/L	20	90	70	130			
Iodomethane		4.20	ug/L	1.0	84	70	130			
Methyl ethyl ketone		48.8	ug/L	20	98	70	130			
Methyl isobutyl ketone		43.6	ug/L	20	87	70	130			
Methylene chloride		5.12	ug/L	1.0	102	70	130			
Styrene		4.60	ug/L	1.0	92	70	130			
1,1,1,2-Tetrachloroethane		4.40	ug/L	1.0	88	70	130			
1,1,2,2-Tetrachloroethane		4.80	ug/L	1.0	96	70	130			
Tetrachloroethene		4.96	ug/L	1.0	99	70	130			
Toluene		5.20	ug/L	1.0	104	80	120			
1,1,1-Trichloroethane		5.28	ug/L	1.0	106	70	130			
1,1,2-Trichloroethane		4.96	ug/L	1.0	99	70	130			
Trichloroethene		5.20	ug/L	1.0	104	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



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Toll Free 877.472.0711 * 406.442.0711 * FAX 406.442.0712 * helena@energylab.com

QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/05/09

Project: 1273 City of Helena

Work Order: H08120197

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B		Analytical Run: 1SATURN_081222A							12/21/08 10:20	
Sample ID: CCV122108A		54 Continuing Calibration Verification Standard								
Trichlorofluoromethane		5.24	ug/L	1.0	105	70	130			
1,2,3-Trichloropropane		4.56	ug/L	1.0	91	70	130			
Vinyl acetate		4.88	ug/L	1.0	98	70	130			
Vinyl chloride		5.60	ug/L	1.0	112	80	120			
m+p-Xylenes		10.2	ug/L	1.0	102	70	130			
o-Xylene		5.08	ug/L	1.0	102	70	130			
Xylenes, Total		15.2	ug/L	1.0	102	70	130			
Surr: 1,2-Dichloroethane-d4				1.0	109	70	130			
Surr: Dibromofluoromethane				1.0	87	70	130			
Surr: p-Bromofluorobenzene				1.0	96	70	130			
Surr: Toluene-d8				1.0	106	70	130			

Method: SW8260B		Batch: R50894								
Sample ID: LCS122108A		54 Laboratory Control Sample							Run: 1SATURN_081222A	
									12/21/08 10:55	
Acetone		42.0	ug/L	20	84	70	130			
Acrylonitrile		38.1	ug/L	20	76	70	130			
Benzene		4.72	ug/L	1.0	94	70	130			
Bromochloromethane		5.60	ug/L	1.0	112	70	130			
Bromodichloromethane		4.92	ug/L	1.0	98	70	130			
Bromoform		4.36	ug/L	1.0	87	70	130			
Bromomethane		5.64	ug/L	1.0	113	70	130			
Carbon disulfide		4.28	ug/L	1.0	86	70	130			
Carbon tetrachloride		5.32	ug/L	1.0	106	70	130			
Chlorobenzene		5.20	ug/L	1.0	104	70	130			
Chlorodibromomethane		4.32	ug/L	1.0	86	70	130			
Chloroethane		4.92	ug/L	1.0	98	70	130			
Chloroform		5.08	ug/L	1.0	102	70	130			
Chloromethane		5.80	ug/L	1.0	116	70	130			
1,2-Dibromo-3-chloropropane		4.84	ug/L	1.0	97	70	130			
1,2-Dibromoethane		4.64	ug/L	1.0	93	70	130			
Dibromomethane		4.48	ug/L	1.0	90	70	130			
1,2-Dichlorobenzene		5.04	ug/L	1.0	101	70	130			
1,4-Dichlorobenzene		5.24	ug/L	1.0	105	70	130			
trans-1,4-Dichloro-2-butene		5.24	ug/L	1.0	105	70	130			
Dichlorodifluoromethane		4.88	ug/L	1.0	98	70	130			
1,1-Dichloroethane		5.52	ug/L	1.0	110	70	130			
1,2-Dichloroethane		5.68	ug/L	1.0	114	70	130			
1,1-Dichloroethene		4.88	ug/L	1.0	98	70	130			
cis-1,2-Dichloroethene		5.16	ug/L	1.0	103	70	130			
trans-1,2-Dichloroethene		5.16	ug/L	1.0	103	70	130			
1,2-Dichloropropane		4.76	ug/L	1.0	95	70	130			
cis-1,3-Dichloropropene		5.00	ug/L	1.0	100	70	130			
trans-1,3-Dichloropropene		4.60	ug/L	1.0	92	70	130			
Ethylbenzene		5.20	ug/L	1.0	104	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
Toll Free 877.472.0711 * 406.442.0711 * FAX 406.442.0712 * helena@energylab.com

QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/05/09

Project: 1273 City of Helena

Work Order: H08120197

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R50894
Sample ID: LCS122108A	54	Laboratory Control Sample				Run: 1SATURN_081222A				12/21/08 10:55
2-Hexanone		43.2	ug/L	20	86	70	130			
Iodomethane		4.16	ug/L	1.0	83	70	130			
Methyl ethyl ketone		44.0	ug/L	20	88	70	130			
Methyl isobutyl ketone		41.2	ug/L	20	82	70	130			
Methylene chloride		4.80	ug/L	1.0	96	70	130			
Styrene		4.80	ug/L	1.0	96	70	130			
1,1,1,2-Tetrachloroethane		4.64	ug/L	1.0	93	70	130			
1,1,2,2-Tetrachloroethane		4.88	ug/L	1.0	98	70	130			
Tetrachloroethene		4.96	ug/L	1.0	99	70	130			
Toluene		5.48	ug/L	1.0	110	70	130			
1,1,1-Trichloroethane		5.36	ug/L	1.0	107	70	130			
1,1,2-Trichloroethane		4.80	ug/L	1.0	96	70	130			
Trichloroethene		5.44	ug/L	1.0	109	70	130			
Trichlorofluoromethane		5.08	ug/L	1.0	102	70	130			
1,2,3-Trichloropropane		5.00	ug/L	1.0	100	70	130			
Vinyl acetate		4.60	ug/L	1.0	92	70	130			
Vinyl chloride		5.48	ug/L	1.0	110	70	130			
m+p-Xylenes		10.8	ug/L	1.0	108	70	130			
o-Xylene		5.32	ug/L	1.0	106	70	130			
Xylenes, Total		16.1	ug/L	1.0	107	70	130			
Surr: 1,2-Dichloroethane-d4				1.0	104	70	130			
Surr: Dibromofluoromethane				1.0	84	70	130			
Surr: p-Bromofluorobenzene				1.0	93	70	130			
Surr: Toluene-d8				1.0	104	70	130			
Sample ID: MBLK122108A	54	Method Blank				Run: 1SATURN_081222A				12/21/08 12:41
Acetone		ND	ug/L	20						
Acrylonitrile		ND	ug/L	20						
Benzene		ND	ug/L	1.0						
Bromochloromethane		ND	ug/L	1.0						
Bromodichloromethane		ND	ug/L	1.0						
Bromoform		ND	ug/L	1.0						
Bromomethane		ND	ug/L	1.0						
Carbon disulfide		ND	ug/L	1.0						
Carbon tetrachloride		ND	ug/L	1.0						
Chlorobenzene		ND	ug/L	1.0						
Chlorodibromomethane		ND	ug/L	1.0						
Chloroethane		ND	ug/L	1.0						
Chloroform		ND	ug/L	1.0						
Chloromethane		ND	ug/L	1.0						
1,2-Dibromo-3-chloropropane		ND	ug/L	1.0						
1,2-Dibromoethane		ND	ug/L	1.0						
Dibromomethane		ND	ug/L	1.0						
1,2-Dichlorobenzene		ND	ug/L	1.0						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/05/09

Project: 1273 City of Helena

Work Order: H08120197

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R50894
Sample ID: MBLK122108A	54	Method Blank				Run: 1SATURN_081222A				12/21/08 12:41
1,4-Dichlorobenzene		ND	ug/L	1.0						
trans-1,4-Dichloro-2-butene		ND	ug/L	1.0						
Dichlorodifluoromethane		ND	ug/L	1.0						
1,1-Dichloroethane		ND	ug/L	1.0						
1,2-Dichloroethane		ND	ug/L	1.0						
1,1-Dichloroethene		ND	ug/L	1.0						
cis-1,2-Dichloroethene		ND	ug/L	1.0						
trans-1,2-Dichloroethene		ND	ug/L	1.0						
1,2-Dichloropropane		ND	ug/L	1.0						
cis-1,3-Dichloropropene		ND	ug/L	1.0						
trans-1,3-Dichloropropene		ND	ug/L	1.0						
Ethylbenzene		ND	ug/L	1.0						
2-Hexanone		ND	ug/L	20						
Iodomethane		ND	ug/L	1.0						
Methyl ethyl ketone		ND	ug/L	20						
Methyl isobutyl ketone		ND	ug/L	20						
Methylene chloride		ND	ug/L	1.0						
Styrene		ND	ug/L	1.0						
1,1,1,2-Tetrachloroethane		ND	ug/L	1.0						
1,1,2,2-Tetrachloroethane		ND	ug/L	1.0						
Tetrachloroethene		ND	ug/L	1.0						
Toluene		ND	ug/L	1.0						
1,1,1-Trichloroethane		ND	ug/L	1.0						
1,1,2-Trichloroethane		ND	ug/L	1.0						
Trichloroethene		ND	ug/L	1.0						
Trichlorofluoromethane		ND	ug/L	1.0						
1,2,3-Trichloropropane		ND	ug/L	1.0						
Vinyl acetate		ND	ug/L	1.0						
Vinyl chloride		ND	ug/L	1.0						
m+p-Xylenes		ND	ug/L	1.0						
o-Xylene		ND	ug/L	1.0						
Xylenes, Total		ND	ug/L	1.0						
Surr: 1,2-Dichloroethane-d4				1.0	102	70	130			
Surr: Dibromofluoromethane				1.0	82	70	130			
Surr: p-Bromofluorobenzene				1.0	91	70	130			
Surr: Toluene-d8				1.0	102	70	130			
Sample ID: H08120197-001AMS	54	Sample Matrix Spike				Run: 1SATURN_081222A				12/21/08 19:07
Acetone		94.4	ug/L	40	94	70	130			
Acrylonitrile		94.4	ug/L	40	94	70	130			
Benzene		9.12	ug/L	2.0	91	70	130			
Bromochloromethane		10.6	ug/L	2.0	106	70	130			
Bromodichloromethane		9.12	ug/L	2.0	91	70	130			
Bromoform		7.68	ug/L	2.0	77	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/05/09

Project: 1273 City of Helena

Work Order: H08120197

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B		Batch: R50894								
Sample ID: H08120197-001AMS	54	Sample Matrix Spike		Run: 1SATURN_081222A				12/21/08 19:07		
Bromomethane		11.5	ug/L	2.0	115	70	130			
Carbon disulfide		9.76	ug/L	2.0	98	70	130			
Carbon tetrachloride		9.12	ug/L	2.0	91	70	130			
Chlorobenzene		9.12	ug/L	2.0	91	70	130			
Chlorodibromomethane		7.90	ug/L	2.0	79	70	130			
Chloroethane		9.04	ug/L	2.0	90	70	130			
Chloroform		11.0	ug/L	2.0	98	70	130			
Chloromethane		10.7	ug/L	2.0	107	70	130			
1,2-Dibromo-3-chloropropane		8.48	ug/L	2.0	85	70	130			
1,2-Dibromoethane		8.48	ug/L	2.0	85	70	130			
Dibromomethane		8.56	ug/L	2.0	86	70	130			
1,2-Dichlorobenzene		8.72	ug/L	2.0	87	70	130			
1,4-Dichlorobenzene		8.48	ug/L	2.0	85	70	130			
trans-1,4-Dichloro-2-butene		9.04	ug/L	2.0	90	70	130			
Dichlorodifluoromethane		9.84	ug/L	2.0	96	70	130			
1,1-Dichloroethane		9.76	ug/L	2.0	96	70	130			
1,2-Dichloroethane		10.4	ug/L	2.0	104	70	130			
1,1-Dichloroethene		9.52	ug/L	2.0	95	70	130			
cis-1,2-Dichloroethene		9.68	ug/L	2.0	97	70	130			
trans-1,2-Dichloroethene		9.44	ug/L	2.0	94	70	130			
1,2-Dichloropropane		8.72	ug/L	2.0	87	70	130			
cis-1,3-Dichloropropene		8.56	ug/L	2.0	86	70	130			
trans-1,3-Dichloropropene		8.80	ug/L	2.0	88	70	130			
Ethylbenzene		8.88	ug/L	2.0	89	70	130			
2-Hexanone		93.6	ug/L	40	94	70	130			
Iodomethane		8.48	ug/L	2.0	85	70	130			
Methyl ethyl ketone		106	ug/L	40	106	70	130			
Methyl isobutyl ketone		92.8	ug/L	40	93	70	130			
Methylene chloride		10.2	ug/L	2.0	102	70	130			
Styrene		8.72	ug/L	2.0	87	70	130			
1,1,1,2-Tetrachloroethane		8.72	ug/L	2.0	87	70	130			
1,1,2,2-Tetrachloroethane		8.32	ug/L	2.0	83	70	130			
Tetrachloroethene		9.04	ug/L	2.0	80	70	130			
Toluene		9.28	ug/L	2.0	93	70	130			
1,1,1-Trichloroethane		9.60	ug/L	2.0	96	70	130			
1,1,2-Trichloroethane		8.72	ug/L	2.0	87	70	130			
Trichloroethene		8.80	ug/L	2.0	88	70	130			
Trichlorofluoromethane		9.92	ug/L	2.0	96	70	130			
1,2,3-Trichloropropane		8.48	ug/L	2.0	85	70	130			
Vinyl acetate		8.88	ug/L	2.0	89	70	130			
Vinyl chloride		10.2	ug/L	2.0	102	70	130			
m+p-Xylenes		17.4	ug/L	2.0	87	70	130			
o-Xylene		9.36	ug/L	2.0	94	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
Toll Free 877.472.0711 * 406.442.0711 * FAX 406.442.0712 * helena@energylab.com

QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Report Date: 01/05/09

Project: 1273 City of Helena

Work Order: H08120197

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R50894
Sample ID: H08120197-001AMS	54	Sample Matrix Spike			Run: 1SATURN_081222A				12/21/08 19:07	
Xylenes, Total		26.8	ug/L	2.0	89	70	130			
Surr: 1,2-Dichloroethane-d4				2.0	115	70	130			
Surr: Dibromofluoromethane				2.0	93	70	130			
Surr: p-Bromofluorobenzene				2.0	94	70	130			
Surr: Toluene-d8				2.0	102	70	130			
Sample ID: H08120197-001AMSD	54	Sample Matrix Spike Duplicate			Run: 1SATURN_081222A				12/21/08 19:36	
Acetone		101	ug/L	40	101	70	130	6.6	20	
Acrylonitrile		94.4	ug/L	40	94	70	130	0	20	
Benzene		10.4	ug/L	2.0	104	70	130	13	20	
Bromochloromethane		11.6	ug/L	2.0	116	70	130	9.4	20	
Bromodichloromethane		9.20	ug/L	2.0	92	70	130	0.9	20	
Bromoform		8.32	ug/L	2.0	83	70	130	8	20	
Bromomethane		11.2	ug/L	2.0	112	70	130	2.8	20	
Carbon disulfide		10.2	ug/L	2.0	102	70	130	4.8	20	
Carbon tetrachloride		10.1	ug/L	2.0	101	70	130	10	20	
Chlorobenzene		9.20	ug/L	2.0	92	70	130	0.9	20	
Chlorodibromomethane		8.64	ug/L	2.0	86	70	130	8.9	20	
Chloroethane		10.1	ug/L	2.0	101	70	130	11	20	
Chloroform		11.5	ug/L	2.0	102	70	130	4.3	20	
Chloromethane		10.5	ug/L	2.0	105	70	130	2.3	20	
1,2-Dibromo-3-chloropropane		9.04	ug/L	2.0	90	70	130	6.4	20	
1,2-Dibromoethane		9.12	ug/L	2.0	91	70	130	7.3	20	
Dibromomethane		8.72	ug/L	2.0	87	70	130	1.9	20	
1,2-Dichlorobenzene		8.80	ug/L	2.0	88	70	130	0.9	20	
1,4-Dichlorobenzene		8.80	ug/L	2.0	88	70	130	3.7	20	
trans-1,4-Dichloro-2-butene		8.80	ug/L	2.0	88	70	130	2.7	20	
Dichlorodifluoromethane		9.68	ug/L	2.0	94	70	130	1.6	20	
1,1-Dichloroethane		10.8	ug/L	2.0	106	70	130	10	20	
1,2-Dichloroethane		10.7	ug/L	2.0	107	70	130	3	20	
1,1-Dichloroethene		9.84	ug/L	2.0	98	70	130	3.3	20	
cis-1,2-Dichloroethene		10.2	ug/L	2.0	102	70	130	4.8	20	
trans-1,2-Dichloroethene		9.84	ug/L	2.0	98	70	130	4.1	20	
1,2-Dichloropropane		9.44	ug/L	2.0	94	70	130	7.9	20	
cis-1,3-Dichloropropene		9.28	ug/L	2.0	93	70	130	8.1	20	
trans-1,3-Dichloropropene		9.52	ug/L	2.0	95	70	130	7.9	20	
Ethylbenzene		9.44	ug/L	2.0	94	70	130	6.1	20	
2-Hexanone		100	ug/L	40	100	70	130	6.6	20	
Iodomethane		9.44	ug/L	2.0	94	70	130	11	20	
Methyl ethyl ketone		112	ug/L	40	112	70	130	5.9	20	
Methyl isobutyl ketone		94.4	ug/L	40	94	70	130	1.7	20	
Methylene chloride		10.3	ug/L	2.0	103	70	130	0.8	20	
Styrene		9.44	ug/L	2.0	94	70	130	7.9	20	
1,1,1,2-Tetrachloroethane		9.04	ug/L	2.0	90	70	130	3.6	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



ENERGY LABORATORIES, INC. * 3161 E Lyndale (59604) * PO Box 5688 * Helena, MT 59601
Toll Free 877.472.0711 * 406.442.0711 * FAX 406.442.0712 * helena@energylab.com

QA/QC Summary Report

Client: Hydrometrics Inc-Helena

Project: 1273 City of Helena

Report Date: 01/05/09

Work Order: H08120197

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										
Sample ID: H08120197-001AMSD	54	Sample Matrix Spike Duplicate					Run: 1SATURN_081222A			Batch: R50894
1,1,2,2-Tetrachloroethane		9.20	ug/L	2.0	92	70	130	10	20	
Tetrachloroethene		10.1	ug/L	2.0	91	70	130	11	20	
Toluene		10.4	ug/L	2.0	104	70	130	11	20	
1,1,1-Trichloroethane		10.3	ug/L	2.0	103	70	130	7.2	20	
1,1,2-Trichloroethane		10.1	ug/L	2.0	101	70	130	14	20	
Trichloroethene		9.76	ug/L	2.0	98	70	130	10	20	
Trichlorofluoromethane		10.5	ug/L	2.0	102	70	130	5.5	20	
1,2,3-Trichloropropane		9.04	ug/L	2.0	90	70	130	6.4	20	
Vinyl acetate		11.2	ug/L	2.0	112	70	130	23	20	R
Vinyl chloride		10.4	ug/L	2.0	104	70	130	1.6	20	
m+p-Xylenes		19.8	ug/L	2.0	99	70	130	12	20	
o-Xylene		10.0	ug/L	2.0	100	70	130	6.6	20	
Xylenes, Total		29.8	ug/L	2.0	99	70	130	10	20	
Surr: 1,2-Dichloroethane-d4				2.0	106	70	130	0	20	
Surr: Dibromofluoromethane				2.0	90	70	130	0	20	
Surr: p-Bromofluorobenzene				2.0	90	70	130	0	20	
Surr: Toluene-d8				2.0	101	70	130	0	20	

Qualifiers:

RL - Analyte reporting limit.

R - RPD exceeds advisory limit.

ND - Not detected at the reporting limit.



2727 Airport Road • Helena, Montana 59601 • (406) 443-4150

[illegible]

Energy Laboratories Inc

Workorder Receipt Checklist



H08120197

Hydrometrics Inc

Login completed by: Roxanne L. Tubbs

Date and Time Received: 12/19/2008 10:20 AM

Reviewed by: *det*

Received by: rlt

Reviewed Date: 12/19/08

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☒	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☒
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☒
Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	
Samples in proper container/bottle?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	
All samples received within holding time?	Yes ☒	No ☐	
Container/Temp Blank temperature:	2.4°C		
Water - VOA vials have zero headspace?	Yes ☒	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☒

Contact and Corrective Action Comments:

None

APPENDIX B

STATISTICAL ANALYSIS REPORTS

APPENDIX B - STATISTICAL ANALYSIS REPORTS
CITY OF HELENA LANDFILL
EVALUATION AND STATISTICAL
GROUNDWATER QUALITY DATA
VALIDATION AND STATISTICAL
EVALUATION OF DECEMBER 2008



Hydrometrics, Inc
Consulting Scientists and Engineers
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Helena, MT 59601
(406) 443-4150

February 2009

